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DECEMBER 1957

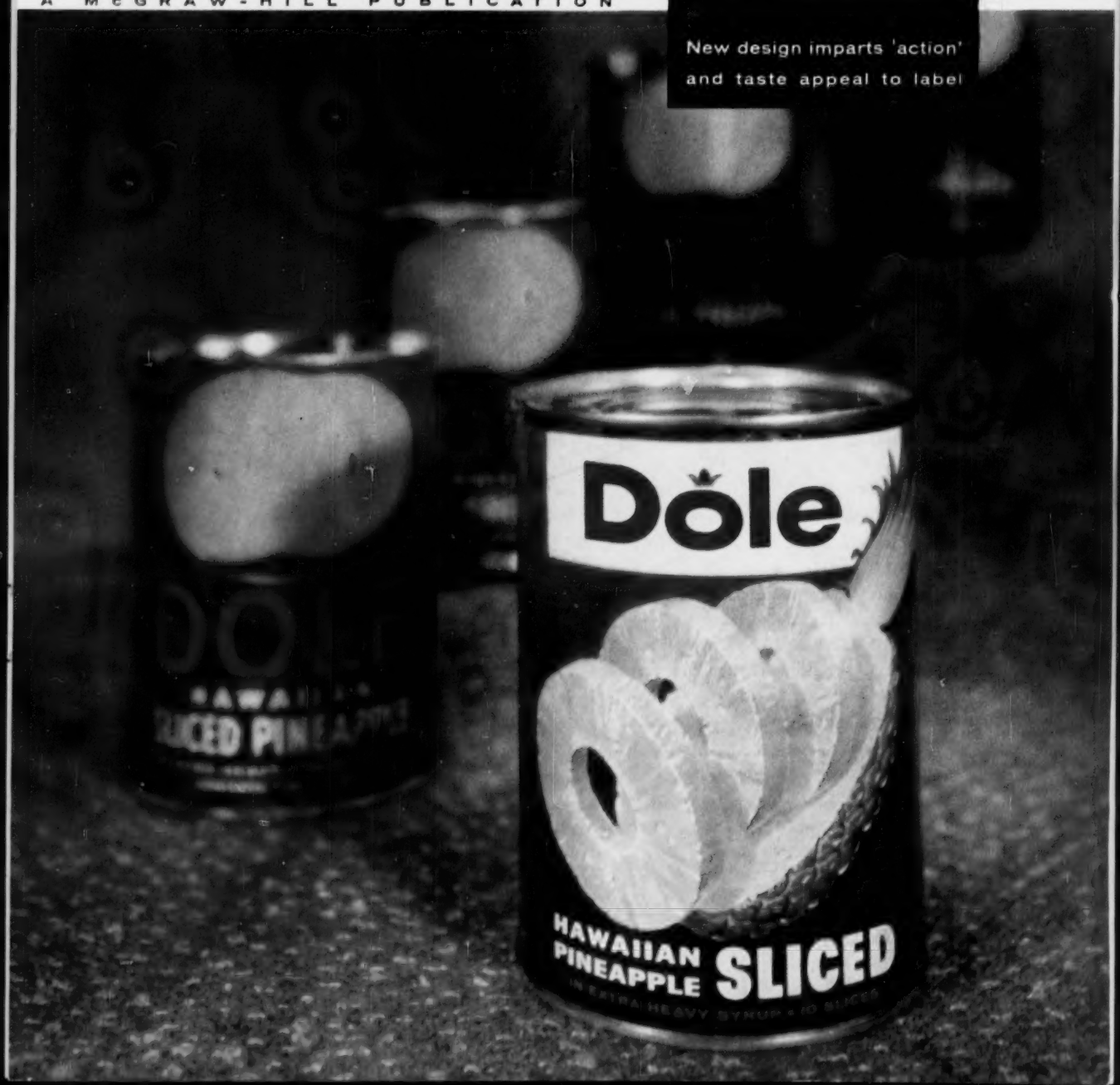
$1.00

FOOD ENGINEERING

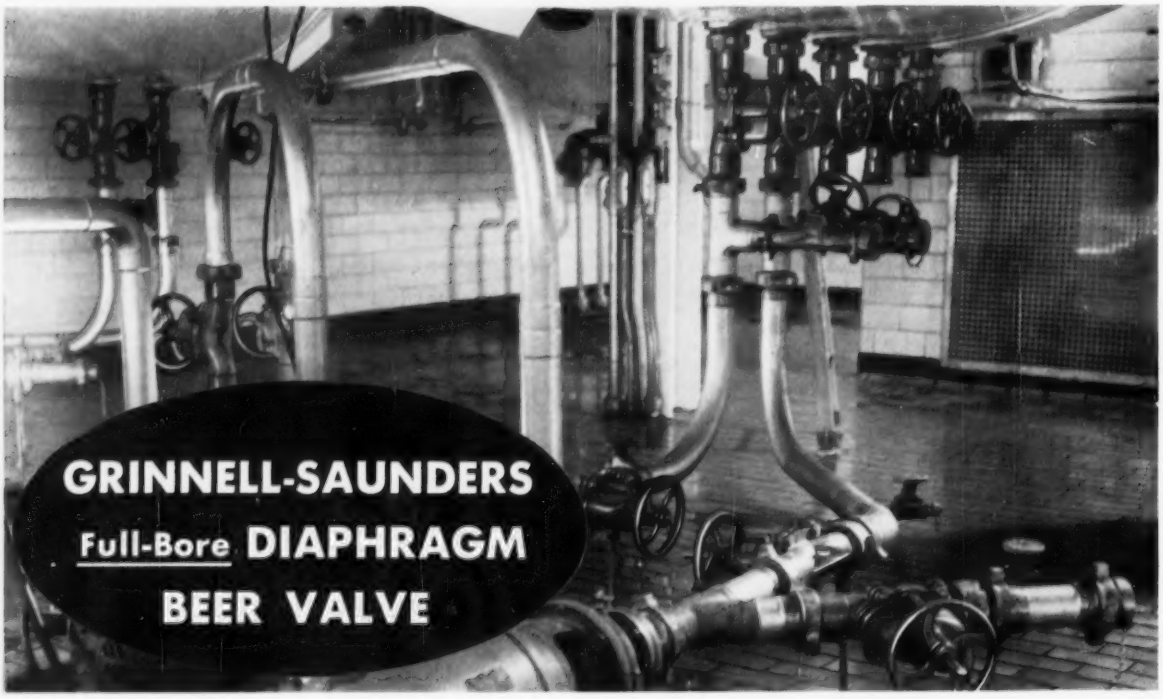
A McGRAW-HILL PUBLICATION

FOR MANAGEMENT
IN MANUFACTURING,
PACKAGING, MARKETING

New design imparts 'action' and taste appeal to label



Meets strict sanitary requirements for product purity



Grinnell-Saunders Diaphragm beer valves installed on suction and discharge lines under transfer tank at Miller Brewing Company, Milwaukee, Wis. Specially-compounded diaphragms impart no taste or color.

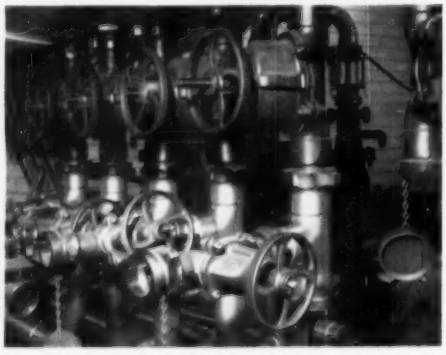
HIGH LIFE

"THE CHAMPAGNE OF BOTTLE BEER"

Today's most modern equipment is used to produce the original, golden brew of MILLER HIGH LIFE beer. Typical are the Grinnell-Saunders *Full-Bore* Diaphragm beer valves designed to meet strict sanitation requirements and special cleaning procedures essential to product purity.

All working parts of the valve are isolated from fluids in the line. The resilient valve diaphragm lifts high for smooth, streamlined flow in either direction, with no pockets to trap fluids. Fully-rounded openings and unobstructed passage permit ball-brush cleaning of both line and valve in a single operation. Moreover, maintenance is simple and inexpensive: long-wearing diaphragm can be replaced without removing the valve body from the line.

These are but a few reasons why the nation's leading brewers are using Grinnell-Saunders Diaphragm beer valves. Available with bronze or stainless steel body; indicating or non-indicating stem; hand-wheel or power operation; socket, flange, or hose ends in any combination. Write for details.



Transfer lines in the stock house are equipped with bank of bronze Grinnell-Saunders beer valves. Valves installed with stem in horizintal position are self-draining.

Diaphragm lifts high permitting ball-brush cleaning

Diaphragm closes for a leak-tight seal

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Walworth iron body saddle type wedge gate valves are suitable for use on steam, water, gas, gasoline, oil, and many process lines. They are easy to take apart, simple to service, fast to reassemble. Walworth saddle-type valves are available in a wide range of sizes in eleven different combinations of design and materials including bronze-mounted, all-iron, and ni-resist; with both flanged and screwed ends. All types can be repacked under pressure when fully opened or fully closed.

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Should You Change Labels?

Dole did—despite the high repute of its old design. And in the salient reasons behind this decision by the enterprising fruit company you'll find many practical working angles to aid you in your own perspective (see article, p. 76).

The new label has greater "image-depth"—giving illusory motion to build plus-selling power. Further, attractive recipes on the reverse side promote varied product uses.

And for Still More Tips

. . . keep a sharp eye, as you go through this issue, for pointed answers on these questions—

What are the chances for clearing up the food-additive picture—so that a food-law amendment can be passed? Such action is needed to require pre-notification of new-additive use. This would alert FDA for additional protection to consumers (p. 51).

How far have researchers got with the techniques of food irradiation True, promising progress is being made (p. 57). But what of the vital plans for comparisons between gamma ray and electron units? (see p. 139).

What key factors should you consider in shaping your marketing plans for the 1960's? (p. 64). And—much more imminent—what 1958 marketing moves call for your careful attention? (p. 70).

Coming now to plant operations, we'll name a few specifics: Savings through systematized floor cleaning (p. 99), hints on getting a new steam system (p. 122), also that newly developed mold-stopping paint (p. 122).

And don't miss our big 4-page fold-out flowsheet detailing Libby of Canada's new quality canning and freezing line (p. 126-129).

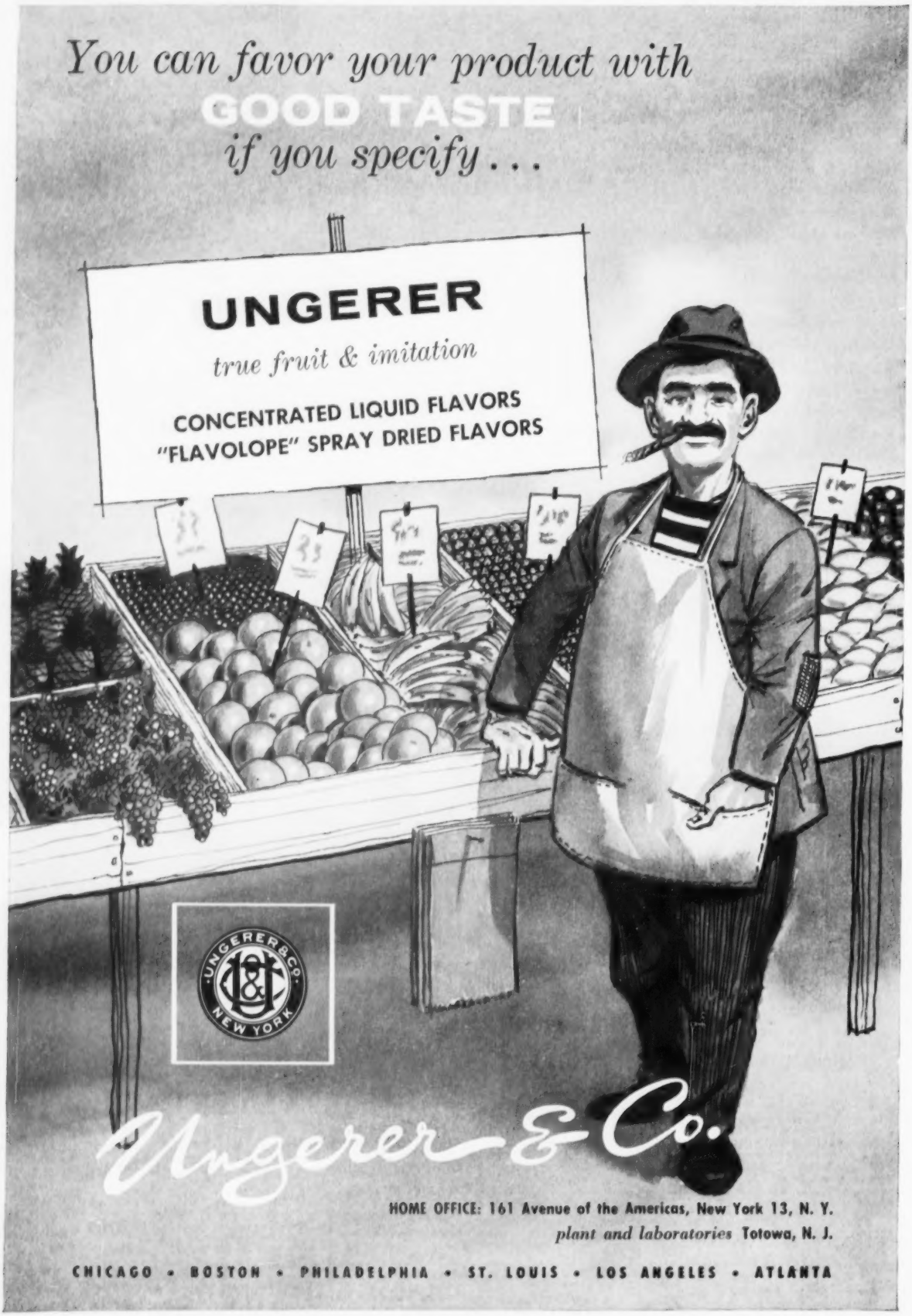
Annual Index will help you to meet future problems by quickly finding helpful information in back issues of FE. Items and articles are classified by subject for handy reference. And features also are indexed by names of authors. (Opposite page 198)

COVER PHOTO . . . Shows contrast between new Dole label (foreground) and old one. (Photo by McGraw-Hill Illustration Department)

You can favor your product with

GOOD TASTE

if you specify . . .



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TRENDS & FORECASTS

Special

FOOD ENGINEERING

Service to Executives

Capital expenditures by food and beverage manufacturers will be down 10% in 1958, a McGraw-Hill survey indicates. The decline will be less than for all manufacturing, off 16%, but more than for all business, off 7%.

Food and beverage manufacturers plan to spend $749 million next year compared to an estimated $828 million in '57 for new plant and equipment. The beverage share is $222 million, which is 1% higher than for 1957.

Spending will be higher for 14% of the companies, lower for 28%, and the same as in '57 for 58%. For all manufacturing, the corresponding figures are 20% up, 23% down, and 57% the same.

Among selected food fields, flour milling is the only one that will not spend less. Capital expenditures will be down 9% for brewing, 15% for baking, 21% for meat packing, and 23% for canning.

But more money will be put into research by 40% of food and kindred products manufacturers, and only 3% plan to spend less for product and process development and improvement. This spells tough competition.

Substantial expenditures for new plant and equipment in 1959 or later are anticipated by 38% of food and related products companies, indicating big future planning on a wide scale.

Food plants were running at 80% of capacity in September, or substantially below preferred 90% rate. So more emphasis on marketing.

Capital Outlay Still High

Despite the indicated drop in capital spending, 1958 will be a good business year. That is the forecast of McGraw-Hill's department of economics, which points out that the outlay for new plant and equipment still will be 10% higher than in 1955 in physical terms; 20% higher dollar-wise.

And with the technical revolution that is arising out of unprecedented investment in research and development, capital spending should start up again relatively soon.

With wages in the food industry continuing to advance, and with competition becoming steadily keener, management will continue to modernize plants and build new facilities in order to survive. In addition, the fast rate of development of new and more convenient products will force spending for new processing and packaging equipment. Then, too, emphasis on reducing marketing costs means investment in new and more efficient order-makeup and materials handling equipment.

So it is important that management put 1958 capital expenditures in proper perspective with respect to other factors.

See Food Business Good in '58

Per capita civilian food consumption through 1958 will be close to the '57 level, according to a forecast by Agricultural Marketing Service, USDA.

Retail food prices may be a little higher than in '57, until at least mid-1958. This reflects anticipated strong consumer demand, slightly lower food supplies, and somewhat higher average marketing margins.

Food supplies in the next several

Why United's patented process results in corkboard of lower moisture absorption

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Trends & Forecasts

months are expected to remain adequate to maintain consumption by civilians at about the level of late '56 and early '57.

Supplies of meat and eggs through next spring will be down some from a year earlier, but there will be about as much turkey meat and lard, and more dairy products and chicken.

Prospects point to more fresh deciduous and citrus fruits this winter and spring than last, and about as much processed fruits and vegetables, sweet potatoes and vegetable oils. Approximately as large a total tonnage of fresh vegetables will be available in the several months ahead, but less potatoes, dry edible beans and dry field peas.

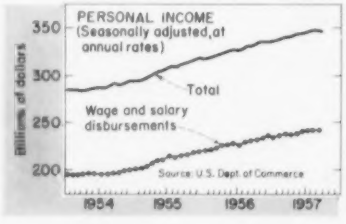
Large stocks of food and feed will be carried over into 1958. If weather is at least average, big food crops can be expected next year.

Production of livestock products will be maintained at a high rate by the large number of livestock on farms and ranches. The level of prices may encourage farmers to raise more hogs than in 1957, with most of the increase marketed after mid-1958. Milk production will likely be up some because of continued increase in output per cow.

No Change in Eating Pattern

No important shifts from the 1957 level, or pattern, of food consumption are anticipated for 1958. Civilians are expected to have a little more per person of pork, chicken meat, fresh oranges and grapefruit, and frozen orange juice concentrate. The increase for pork will be concentrated in the second half of 1958.

Small reductions from the 1957 rate are in prospect for beef and veal. These declines will bring the meat consumption rate slightly be-



KEY FACTOR in surprisingly rapid growth of food sales is trend in income shown by these curves. Tendency now is toward levelling off, which points to stiffer competition in food industry.

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*Depending on package size, type loading case, casing pattern.

Many of General Mills famous products are cased by 33 high-speed "Sure-Way" Casers. Typical is this trouble-free installation at their Toledo, Ohio, plant.

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Unmatched for flexibility of case loading patterns, package sizes

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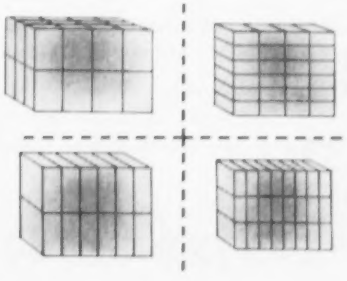

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Plants with wet processing have a real lubrication problem when steam, water or liquids from the processing operation enter the lubrication system. Many lubricating oils emulsify when agitated with water, especially when there is a small amount of dirt present. With water in the oil, there is the chance that no oil film exists between metal surfaces. Result: wear, corrosion, equipment failure. The chance of this happening is eliminated when you use STANOIL Industrial Oil.

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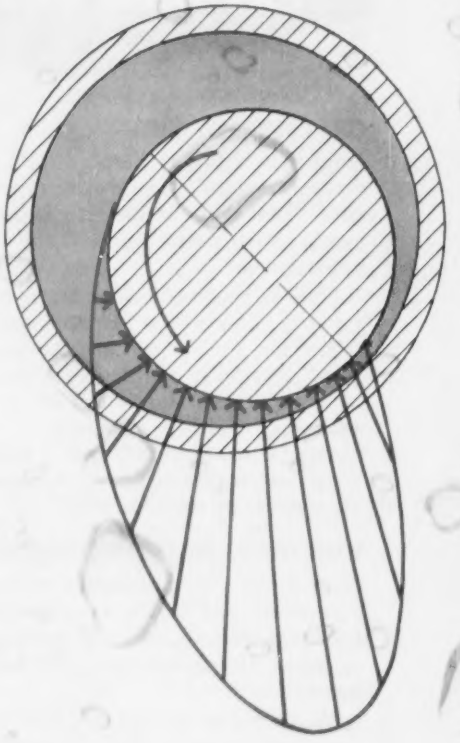

This is just one way in which STANOIL Industrial Oil can help you get superior lubrication of equipment. STANOIL has unusually high stability, gives longer oil life, minimizes carbon deposits and wear of equipment. A special rust inhibitor prevents rust and corrosion by "plating out" on metal surfaces.

STANOIL's low pour point assures a free-flowing lubricant in cold service and at start up.

STANOIL has a high viscosity index, resists viscosity change over a wide temperature range. The low carbon-forming tendency of STANOIL means low-cost operation and long-service life of equipment.

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STANDARD OIL COMPANY
(Indiana)

STANDARD

low that of 1957, but it probably will be higher than in most of the 45 years before 1955. Compared with 1957, some reduction in the consumption rate next year is also likely for eggs and canned fish.

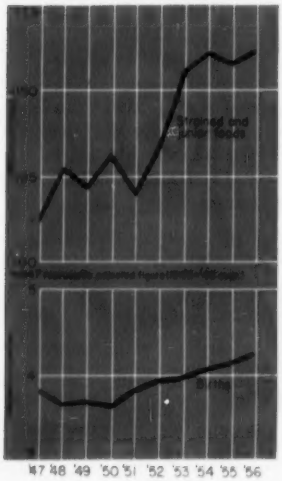
For the other major food groups, civilian consumption in 1958 is expected to be about the same as this year's rate.

Packers Fight Problems

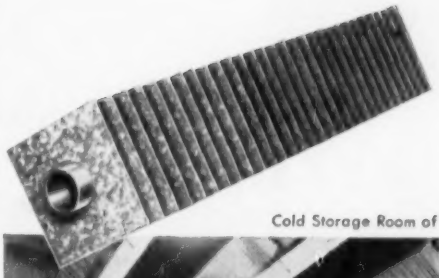
Tough sledding is mixed with hope in the meat packing field. Operating expenses have increased from about 18% to 28% of total sales in the past ten years. Sales volume, because of livestock shortages, are down some 4% this year. Earnings have dropped from 1.5 to 1% of the sales dollar, AMI reports.

Low cost of producing competing poultry is another headache. Poultry growers get about 1 lb. of live weight for 2¼ lb. of feed. But it takes 10 lb. of feed to put a pound on beef animals; 4 lb. for hogs.

Consumers are demanding more lean meat and less fat than is economical with currently produced American hogs. This has no connection with the bad publicity fats have received recently — another worry which packers hope to resolve by re-



BABY FOOD BOOM (+43.2%) far outstrips birth rate (+10.5%) over past 10 years. Future looks good, but Gerber points out that potential lies not only in new births but in new products, like those for older babies to lengthen the span of use. Birth rate is expected to reach 6 million by 1975.



With the complete absence of fans, blowers, or ducts, you will find that Zer-O-Disc fin coils give you less trouble than any other type of coil surface. Due to their unique design you save significantly in price, space, weight, labor and refrigerant.

Cold Storage Room of the **H. H. Meyer Packing Co., Cincinnati, Ohio.**

SAUSAGE HEAVEN...

No shrinking links in this cold storage room!

Full, firm links... no shrivel... no shrinkage—that's the success story of sausage storage in the holding room of the *H. H. Meyer Packing Co., Cincinnati, Ohio.* Vilter Zer-O-Disc fin coils provide the desired cooling.

Vilter Zer-O-Disc fin coils are a smart buy for storage cooling. Correct temperature and humidity are maintained because these coils produce slow, even, positive air circulation naturally by convection. The extended fin surface cools the slowly moving air mass more quickly... floods the room with cold... holds temperature at proper level for better storage. There are no "dead spots" in the room. Product discoloration or shrinkage are minimized.

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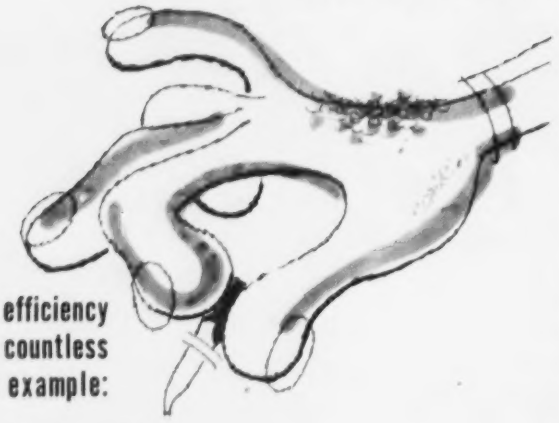

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Trends & Forecasts

search into fat's place in the diet.

Another research project, one that may result in far-reaching developments, involves meat tenderizing. If tough parts of beef carcasses could be tenderized chemically, aging time and inventory costs could be cut. Then producers and feeders would seek fast-growing cattle without worrying about body conformation.

HORS D'OEUVRES

▶ **Nature provided a way to improve the breed in bees. The queen mates in fast flight, and therefore with the strongest of the males. So there is something besides madness in the chase.**

▶ **Not to be outdone by toy manufacturers, our industry has created Sputnik Earth Satellite Bubble Gum —with an asteroid finish, yet. Too bad that the inspiration for Poochnik dog biscuits took a reverse twist.**

▶ The future of the food manufacturing industry is assured by this fact: Consumers are paying less attention to diets that sustain life and more to those that make life worth living.

▶ **Teenagers, some 16 million of them, have an annual income of about $9 billion. Should be a market for Teen-Time Tidbits, Snicker Snacks, and Giggle Goobers.**

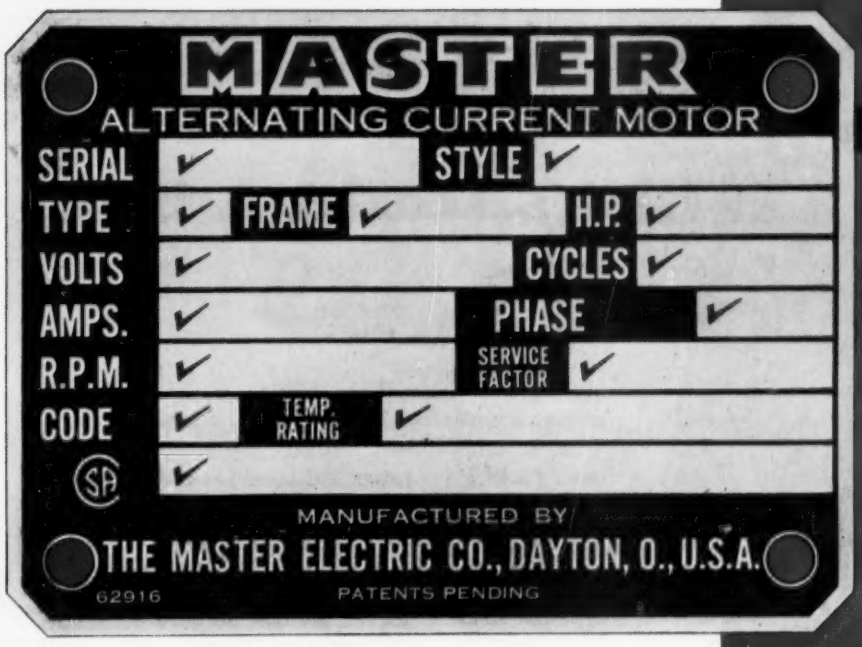
▶ Said Robert Louis Stevenson: "A bottle of wine, like a good act, shines even in the retrospect." But remember that overacting spoils the shine.

▶ **Fifty percent of the Russian family budget goes for food. Which by Commie logic means that they eat twice as well as Americans.**

▶ A young herring was frightened by a submarine, until its mother calmly remarked: "Don't get excited, its only a can of people."

▶ **If food shoppers are as price-conscious as many profit-slashers believe, how come there's so much budget-be-damned impulse buying?**

Write your own ticket—



What are your power drive requirements? Here at Master, with the widest selection in the nation to choose from, you're sure to fill your needs quickest and best.

Need something special in gear reduction—electric brakes—variable speed operation—fluid drive or special mounting? Or would some of our standard models (⅛ to 400 H.P.) fill the bill? You'll find the answer here! And remember, all Master components are engineered to form combinations of units in one streamlined, compact package of efficiency. Name your need and the name that fills it is Master—for greater salability of motor driven products; for increased productivity of plant equipment.

Motor Ratings..⅛ to 400 H.P. All phases, voltages and frequencies.

Motor Types.....Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.

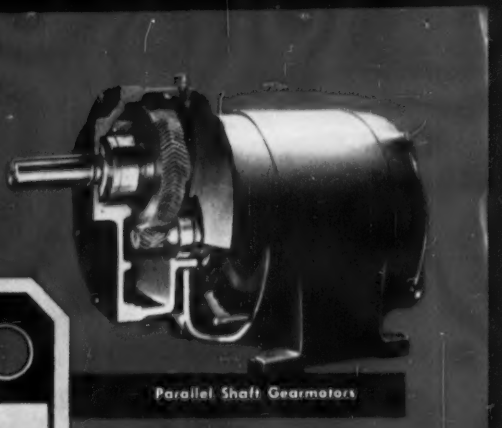
Construction ....Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.

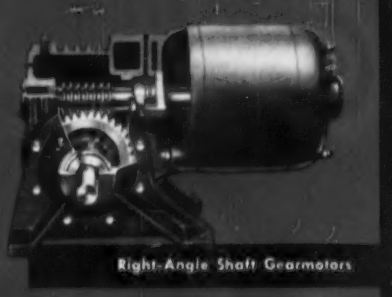
Speeds .....Single speed, multi-speed, and variable speed.

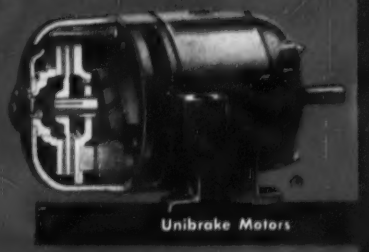
Installation .....Horizontal or vertical, with or without flanges and other features.

Power Drive Features .....Electric brakes (2 types)— 5 types of gear reduction up to 432 to 1 ratio. Mechanically and electronically-controlled variable speed units—fluid drives—every type of mounting.

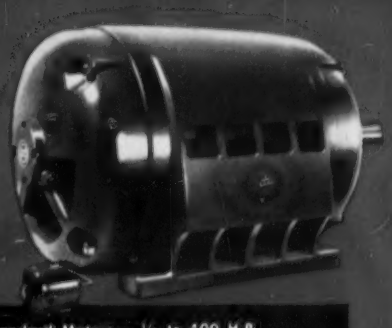
THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO


Parallel Shaft Gearmotors


Right-Angle Shaft Gearmotors

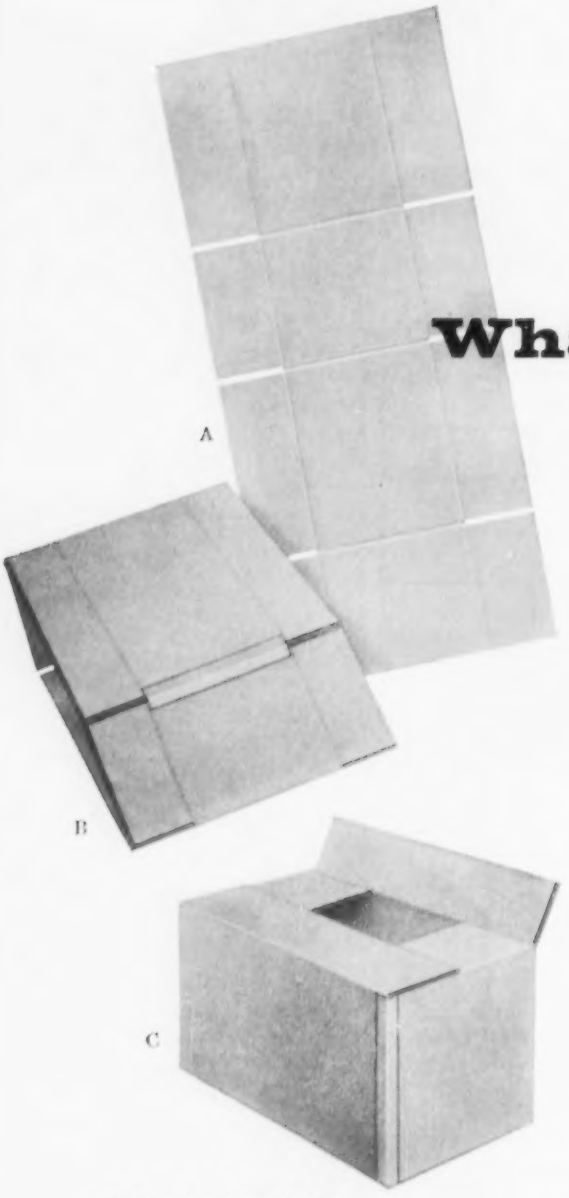

Unibrake Motors

Speedrangers


Standard Motors— ⅛ to 400 H.P.

What you should know about

What should a box



A. Scored and slotted sheet
B. Folded and taped
C. Assembled box

The "creases", or scores, on corrugated boxes facilitate folding. When straight, and properly formed, they make your packing job easier and faster, assure maximum strength and serviceability of the box.

But just being straight isn't enough. Too narrow or too shallow a score sets up internal stresses, makes the box hard to fold. Too deep, weakens the board, makes the fold easy to tear and come apart during shipment.

What makes a perfect score?

Scoring the sheet

It depends largely on the thickness and type of board, the scoring process, what you are shipping, and how it is shipped. First, the score must fold without cracking the board. It must also fold straight, regardless of the direction of the corrugations. It must not cramp the inner liners too much when folded at 180°. And it must, under test, withstand

← For more data, circle this page number on card at back

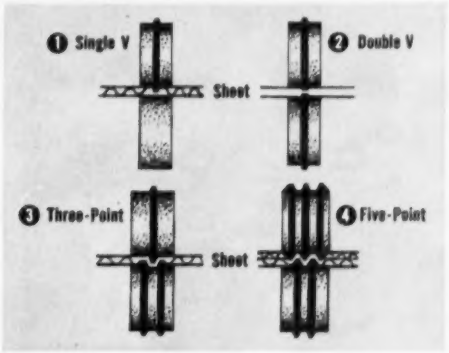
scoring and slotting of Union Boxes

"crease" be...besides straight?

combined tearing, bending and tension forces simulating those it will meet in actual service.

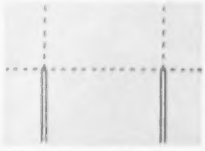
The different kinds of scores

There are four basic methods of scoring corrugated board. 1. The "Single V" crease—most commonly used when the direction of the score is parallel to the corrugations. 2. The "Double V"—generally used *across* the corrugations and where a clean, good-looking fold is essential. 3. The "Three-Point" crease — good both "with" and "across" corrugations. Used where high tearing strength is paramount. And 4., the "Five-Point" crease. This, too, scores both ways. It is used almost exclusively for double wall board.



The importance of slotting

Slots, cut by razor-sharp knives, form the top and bottom flaps of your corrugated box. Each slot must cut to an exact width, and at right angles to the flap scores so that the folded flaps will be perfectly parallel where they come together. The knives must cut a clean slot, without ragged edges or "lint". Improper slotting can seriously impair the appearance and protective qualities of your finished box.


Slots form the flaps

At Union, slotting and scoring of corrugated containers is an exact science. It's one small part of Union's complete structural design service to assure you maximum product protection. It's one of the reasons why Union-engineered boxes are used consistently by shippers in every industry.

union camp

Write for Union's free, informative booklet "Manufacturing Sheets for Corrugated Boxes."

UNION BOXES

UNION BAG-CAMP PAPER Corporation
233 BROADWAY, NEW YORK 7, N.Y.

Factories: *Savannah, Ga.; Trenton, N.J.; Chicago, Ill.; Lakeland, Fla.*

Sales Offices: *Eastern Division—1400 E. State Street, Trenton, N.J.*
Southern Division—P.O. Box 570, Savannah, Ga.; P.O. Box 454, Lakeland, Fla.
Western Division—4545 W. Palmer, Chicago, Ill.

For more data, circle this page number on card at back →

Season's Greetings!
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Keith M. Baldwin
Asst. Sales Mgr.
Dr. J. K. Krum
Asst. Tech. Dir.
L. R. Patton, Jr.
Asst. Sales Mgr.
Sylvester A. Ryan
Asst. Sales Mgr.
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Kansas City
Jack A. Revord
Chicago
D. L. Nunn
Kansas City
W. Quincy Isaacs
Kansas City
Jim Doty
(Consultant)
Mrs. Blaine Thompson
Dallas
To all our friends, our sincere wishes for a very Merry Christmas and a Happy and Prosperous New Year.
R. S. Whiteside
President
Sterwin Chemicals Inc.
Subsidiary of Sterling Drug Inc.
1450 Broadway, New York 18, N. Y.
IN CANADA:
Sterwin Chemicals Of Canada Ltd.
1019 Elliott Street W., Windsor, Ont.

DEVELOPMENTS TO WATCH

Special

FOOD ENGINEERING

Service to Executives

Urethane foam insulation can be sprayed onto walls and ceilings. Savings in application time are reported to more than offset extra cost of materials. Prepolymer, catalyst, and air are metered into spray gun.

Giant collapsible rubber-fabric bulk container holds 3,800 gal. of liquid and permits trucks or RR cars to haul dry products one way and fluid on return run. The 56-in.-dia. U.S. Rubber Sealdtank is 35-ft. long.

Food can be irradiated in lab with self-contained pushbutton unit developed by Nuclear Systems. Using up to 25,000 curies of Cobalt 60, it handles sample up to 10-in. long and of 10-in. dia.

Order selection will be achieved automatically by IBM cards and electronic control of movement from multi-tier live-storage conveyors. Four hundred varieties of case-packed frozen foods are involved.

Incorporated into process control system, digital computers perform similarly to "super-operator" who reads many instruments, makes calculations, and adjusts variables quickly, continuously, and without error.

Moisture content of fresh apples is reduced to a low 3% by a new continuous drying process in a Western dehydrating plant. Two-stage dehydration, more time consuming and costly, previously was required.

Aroma is being added to instant coffee by four leading producers. Aromatic factor is removed before extraction, then added to finished product. Whether coffee in cup is improved is controversial question.

Modified fats from domestic oils now in surplus may further replace cocoa butter in confections. Several such modified fats with qualities of more expensive cocoa butter have been prepared by researchers.

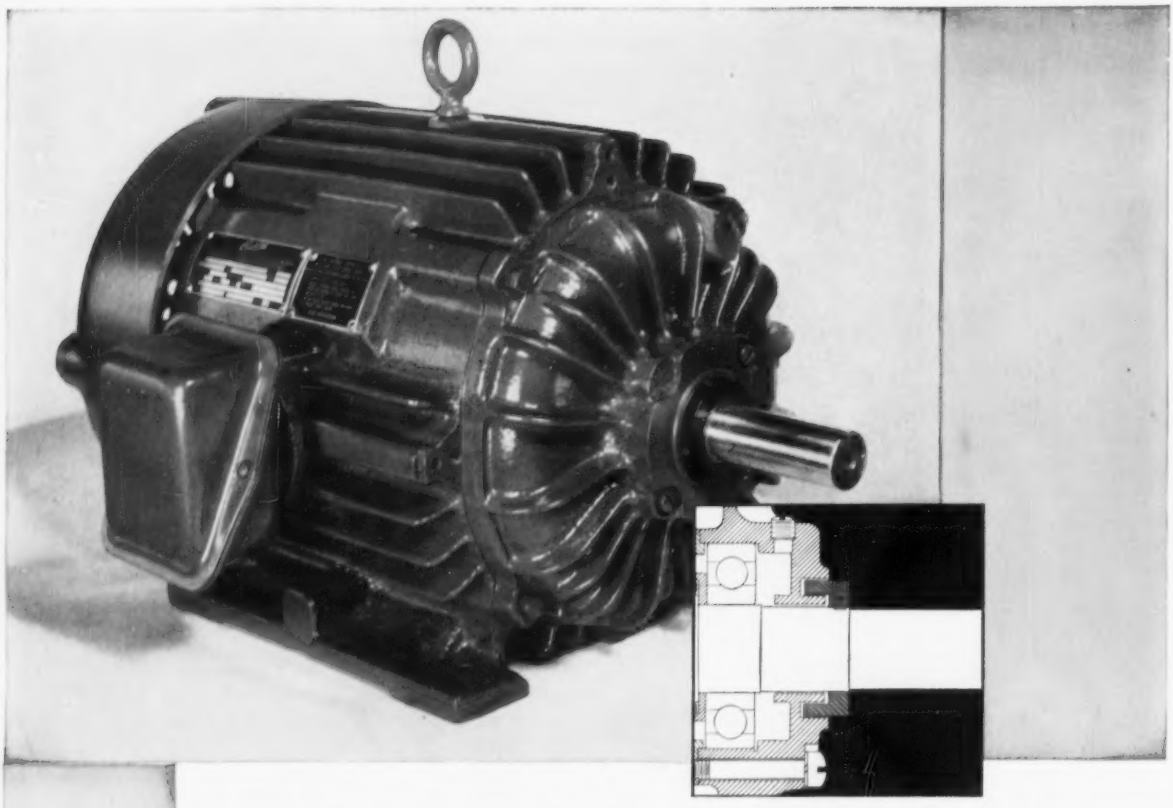
Convenience of oil is combined with stability of solid shortening in new all-vegetable frying medium developed by Procter & Gamble. Called Fry-max, it is packed in 5-qt. cans and bulk drums.

Impetus to development of better equipment for meat plants stems from recommendations by Ford engineer. Automatic positioning, automatic sausage and bacon processing, and mechanized cutting are specifics.

Convenient new container for fruits and nuts is plastic-coated paper bowl that makes attractive serving dish. Housewife removes overwrap and puts bowl of food on table. Paper is decoratively printed.

Watch for still more foods to be packed in "picture packages". Sharp multi-color illustrations of products are proving effective silent salesmen because of strong eye and appetite appeal.

You'll see continuation of trend in food company management to coordinate sales and advertising operations under marketing managers. Kraft has such managers over each of four product lines.



Securely sealed for low maintenance —

Century TOTALLY ENCLOSED FAN COOLED MOTORS

When motor maintenance goes down, production goes up. Century TEFC Motor *protects itself* from dust, grit, chemical fumes, moisture. Shaft openings at each end are labyrinth-sealed, and there is a precision clearance between metal seal and bearing bracket.

Outside, a hose or whisk broom quickly cleans it. External fan forces jets of cooling air across the frame. Inside, vital motor parts are completely sealed off from injurious atmosphere. Factory lubrication of bearings is adequate for several years' service under normal conditions; however, whenever required bearings may be relubricated through grease plugs.

For full facts on your specific application, call the Century District Office or Authorized Distributor nearest you.

CENTURY . . . building TEFC Motors for 25 years

CE-66R

Performance-Rated©
MOTORS
1/20 to 400 H.P.

CENTURY ELECTRIC COMPANY

1806 Pine Street • St. Louis 3, Missouri • *Offices and Stock Points in Principal Cities*

B.F.Goodrich report:

Cannery cuts glove costs in half by switching to B.F.Goodrich brand

IN the 5-year period since standardizing 100 per cent on B.F.Goodrich rubber gloves, a California cannery reports that glove costs have been cut nearly one half. Reason is that these gloves stand hard use, last longer.

B.F.Goodrich canner's gloves are more than just strong—they are uniformly strong, even between the fingers where many gloves are weak. Use of a special rubber compound provides maximum resistance against the conditions encountered in food processing plants.

These gloves are ideal for use where finger dexterity is required. They are thin, light, soft and flexible. Palms and fingers have a molded-in crinkle finish, which gives sure, positive grip even when wet, slippery fruits and vegetables are being handled.

Workers like B.F.Goodrich canner's gloves because they are more comfortable in feel and fit. A special process makes them easy to put on and take off. They have curved fingers for added comfort and work ease; are made with an extra fullness at the back for free action. Long gauntlet can be worn straight or cuffed.

B.F.Goodrich Style 5293 canner's gloves are made in an attractive russet color, in sizes 7, 7½, 8, 8½, 9, and 10. They are sold by B.F.Goodrich distributors everywhere. Arrange to try these longer-lasting rubber gloves in your plant. See if they don't cut your glove costs. *B.F.Goodrich Industrial Products Co., Dept. M-192, Akron 18, O.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

For more data circle this page number on card at back →

NEW PACKAGES & PRODUCTS

Juice Multi-Pack

Test-marketed by Minute Maid Corp. is a special offer of three cans of frozen fruit juice joined with a Continental Can Co. Can-Trak. The tiny carrier grips the top rims of three cans in die-cut slots.

Only an inch deep, the carrier permits maximum view of the can labels, while offering a large top display area for the label. The cans can be varied to give the consumer a choice of two or more juice flavors.

Circle 20A on Reader Service Card

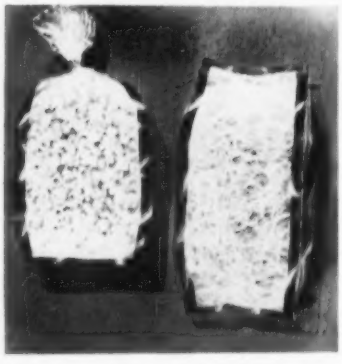
ZIPPER LABEL on Lever Brothers Co.'s Spry enables consumer to unwind roll of recipes. The recipes are cut out so they may be placed in a card index file. Processor plans to change the labels every few months to feature new recipes developed by the Spry home economists.

Processor Adds Entrees

American Home Foods Institution Products have added three new items to their line:

- Chef New Beef and Pork in southern style barbecue sauce in 30 oz. cans.
- Chef New Beef Stew, made from green peas, carrots, potatoes, and spicing.
- Chef New Meatless Cheese Ravioli in sauce.

APPETITE APPEAL has been added to the new Domino Sugar cartons. Designed for modern self-service shopping, the new labels highlight tempting illustrations of dishes made with the various styles of sugar.



Windowed Polyethylene Bag

A stock polyethylene bag, printed in color but featuring a strip of clear film on the face, has been introduced by Milprint, Inc. Called Color-Vue, the bag is an attractive display item since the coloring frames the visible product.

Opaque coloring is extruded on the polyethylene, reducing the problem of scuffing or soiling. Colors available are orange, black, red, blue, green, purple, yellow, gold, and silver.

Window size can be varied to fit the label.

Circle 20B on Reader Service Card

Larger Fish Cartons

Reported to be the first time fresh, frozen fish has been packaged in 3 and 10 lb. printed cartons for retail trade, are the latest products of Consolidated Fisheries Corp.

Designed by Sutherland Paper Company, the printed cartons carry different labels: the 3 lb. package carries a bright abstract design done in a humorous vein, using a fish symbol personalized as a chef; the 10 lb. carton displays a large fishing schooner.

The larger carton is infold type with full telescoping construction. The 3 lb. package is a one piece set-up, Dura-Set treated.

Circle 20C on Reader Service Card

Cans for Sauerkraut

Weber Kraut and Canning Co., St. Louis, is now using large cans for its sauerkraut instead of the conventional wooden barrels.

The kraut is packed in a polyethylene bag placed inside the 42-lb. round flaring slip cover cans. The cans, made by American Can Co., were adopted because they were easier to open and seal than the barrels.

Riegel

ONE OF THE OLDEST NAMES IN PROTECTIVE PACKAGING MATERIALS

waxing, laminating, coating . . . gravure and flexographic printing . . . laminations and combinations of poly, cellophane, Mylar®, foil, glassine and pouch paper.

Now a NEW name in . . .

* PRINTED POLYETHYLENE FILM
* CELLOPHANE-POLY and
* MYLAR®-POLY EXTRUSIONS

(printed or plain)

Our new Indiana Plant has been equipped to specialize in the production of printed polyethylene film, and extrusions of polyethylene on cellophane and Mylar®. It will also produce most of the wide range of protective packaging materials made at our Milford (N. J.) Division.

YOUR INQUIRIES ARE INVITED

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BETTER LUBRICATION

FOR BALL AND ROLLER
BEARINGS

BALL BEARING LUBRIPLATE . . . a most effective grease type lubricant that also protects ball and roller bearings against rust and corrosion. Highly recommended for speeds up to 5,000 RPM and temperatures up to 300° F.

LUBRIPLATE No. 205 . . . an unusually light consistency, grease type lubricant made for use in anti-friction bearings operating at speeds in excess of 5,000 RPM.

LUBRIPLATE Nos. 1, 2, 4 and 8 are fluid type lubricants of various viscosities that have given outstanding results in anti-friction oil type bearings. Nos. 1 and 2 are recommended for high speed applications; nos. 4 and 8 are recommended for slow speed, heavy load applications.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK". . . a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.

Packages & Products

Carton Needs No Overwrap

A thermoplastic sealed carton that requires no waxed overwrap is used for Luigi's frozen pizza. The package offers high protection and eye appeal—but at a savings.

The processor, Luigi's Pizza, Inc., ton treated with a cold wax process to produce a rugged, high gloss finish. The thermoplastic adhesive is a hot melt type. Carton requires neither an inner nor outer liner. Tests are reported to have shown that the package will hold water up to 48 hr. without leakage.

Cartons are supplied by Gaylord Container Corp.

Circle 22A on Reader Service Card

BAG OF CHEESE allows dairy to capitalize on fluffy appearance of dry curd cottage cheese while insuring full product protection. The Lucerne Milk Co. uses clear polyethylene for the bag, printing it in red and blue. Provided by Continental Can Co.'s Shellmar Betner Division, the bag is slip-treated to aid in filling. Capacity is 32 oz.

Circle 22B on Reader Service Card

Market Aluminum Cans

Continental Can Co. is making aluminum cans available in several styles. Initially available are three-piece and drawn cans. Early next year, the supplier will market cans formed by impact extrusion.

The announcement comes close on the heels of Kraft Foods adaptation of Kaiser aluminum cans for its grated cheese (FE, November '57, p. 84).

General Lucius D. Clay, Continental chairman of the board admitted that initial costs will be significantly higher than tinplate. But, he said, the differential is "expected to shrink progressively as aluminum manufacturers are able to trim costs by more efficient production of can stock and manufacturing processes are improved."

The can company has been experimenting with the aluminum cans for 24 years.

Circle 22C on Reader Service Card

Printed-Dome Aerosol

A new pressure package design—Spra-tainer—has been developed by Crown Cork & Seal Co. The 12-oz. fabricated aerosol can features printing on the standard deep-drawn dome top.

Originally developed for Reddi-Wip, Inc., the can is now available to processors. The printed dome offers high decoration and merchandising opportunities.

Circle 22D on Reader Service Card

Finest
Apples
These apples are being stacked higher than ever before, thanks to Gaylord boxes designed to meet special cold storage conditions.

BOXES STACKED TO THE ROOF SAVE MONEY

...but you cannot stack them to the roof unless you have boxes that will take high-stack pressure. The more difficult your problem, the more important it is to get the right kind of boxes.

If you think that unusually tough box requirements limit your stacking height, let Gaylord tackle the job. Call your nearby Gaylord packaging engineer.

Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS
KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

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NEW HUSTLE FOR '58 . . . CHEVROLET LIGHT- AND MEDIUM-DUTY HAULERS

More horsepower . . . more staying power in V8's and 6's!

New Chevrolet light-duty Apache and medium-duty Viking models bring you V8's and 6's that deliver more horsepower, more economical and dependable hauling for the toughest jobs you've got!

There's new standard power in every light-duty model . . . a more powerful (145 h.p.!) edition of the engine most famous for economy and dependability, the rugged Thriftmaster 6. And the optional (extra-cost) Trademaster V8 is *all new*, the most highly powered light-duty truck engine in Chevrolet history! It's ready to go to work with 160 h.p., 283 cubic inches of displacement, short-stroke efficiency and weight-saving compactness!

Chevy for '58 is here with new medium-duty power, too! Standard in Series 50 L.C.F. models is a new version of the Heavy-Duty Taskmaster V8, with 160 h.p. for fleet hauling and new durability features such as Stellite-faced exhaust valves and induction-hardened exhaust valve seats. And standard in Series 60 models is the time-proved Jobmaster 6 with more power than ever—150 h.p.—and a host of new features that mean more economy and dependability on jobs that work a truck hard. See your Chevrolet dealer and *save* with Chevy's new brand of hustle! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Latest editions of the "Big Wheel" in trucks

NEW CHEVROLET TASK·FORCE 58 TRUCKS

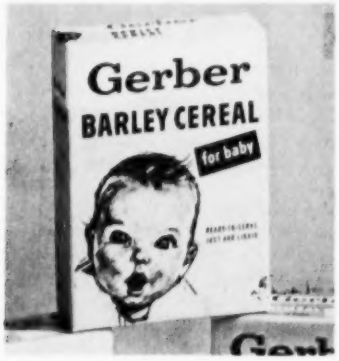
CHEVROLET

← For more data, circle this page number on card at back

Non-Refrigerated Hams

Publicized as the first 3 lb. canned hams not requiring refrigeration are those now marketed by the P. Brennan Co. of Chicago.

The products, Lee Brand Skinless and Boneless Hams, are packaged in American Can Co. Lithograph "No-Stick" cans. Ham shrinking during processing is reported to have been reduced by 100%.



Improves Carton Design

Redesigned packages for the Gerber baby cereal line, are remodeled in step with current self-service requirements. The new design calls attention to brand name and built-in convenience features, such as Gerber's improved pouring spout.

The five cereals in the line now have a greater family resemblance, and package eye-appeal has been increased. The larger size Gerber baby on the face panel gives quicker brand recognition.

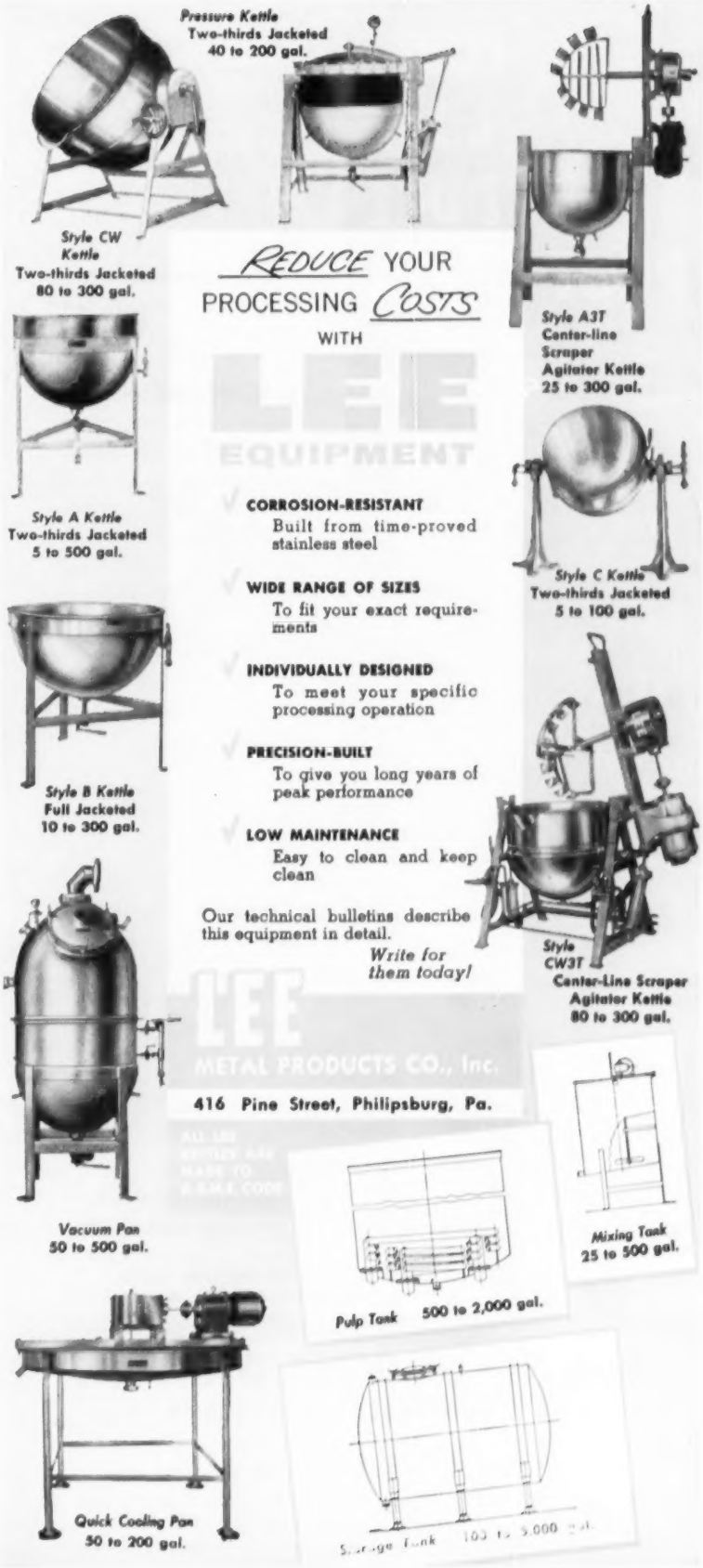
All wrappers are specially coated for moisture protection, except the general white rectangle left on top for easy pricing. A different color wrapper identifies each cereal variety.

Recently introduced by the same processor is a High Meat Dinner, after extensive test marketing. The new products feature three times as much meat as conventional meat-and-vegetable combination.

The products are: beef with vegetables, chicken with vegetables, veal with vegetables. All are offered in both strained and Junior textures.

3 New Cake Mixes

• Banana cake mix has been introduced by General Foods under its Swans Down label. It is the ninth



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LOW-COST PRODUCT PROTECTION

For over forty-five years **NULOMOLINE®**—*the pioneer* invert sugar—has been used as a "BALANCING" ingredient by Bakers, Candymakers, Syrup Processors, Fruit Preservers . . . in frozen foods, desserts, icings, toppings, spreads, and other food preparations.

NULOMOLINE is hygroscopic . . . attracts, retains, and equalizes distribution of moisture . . . retards crystallization . . . increases osmotic pressure . . . stabilizes density of syrup portion . . . resists fermentation . . . controls texture and consistence . . . promotes product uniformity . . . improves taste and appearance.

USE NULOMOLINE . . . THE LOW-COST HYGROSCOPIC HUMECTANT . . .

Packed in large and small containers—
in tank wagons and tank cars.

ORDER DIRECT OR THROUGH YOUR JOBBER.

Write, phone, or call and discuss your problems in confidence with **NULOMOLINE SERVICE.** Our technical and practical staffs are *at your service!*

THE NULOMOLINE DIVISION
AMERICAN MOLASSES COMPANY

Manufacturers of NULOMOLINE *(Standardized Invert Sugar) and Syrups*

120 WALL STREET, NEW YORK 5, N. Y.

330 East N. Water St., Chicago 11, Ill. 1300 West 3rd St., Los Angeles 17 Calif

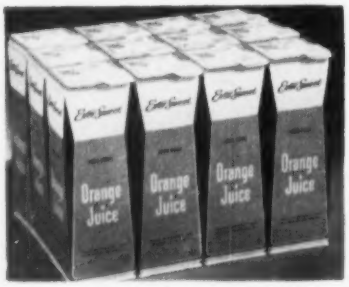
NULOMOLINE, LTD., 1461 Parthenais St., Montreal, Canada

Packages & Products

instant cake mix added to the line.

• Black walnut is the newest flavor in the General Mills' Betty Crocker cake mix series. The flavor is the thirteenth to be marketed.

• Sugarless yellow cake mix is a new product of 6-O-Clock Foods Inc. The dietetic mix is distributed nationally under the 7-Minit label.



"3-D" Juice Carton

An unusual three-dimensional effect is achieved with EverSweet Corp.'s new design for its orange juice carton. The "slimline" labeling concept is designed to "lend dignity and refinement rather than gross bulk."

The main color is orange to identify contents. Charcoal grey has been used to shape the decanter form, blending with adjacent cartons to enhance the decanter effect. Stock carton color is kept to a minimum to avoid confusion with milk cartons.

A "drop" of orange juice on the top of the carton helps identify it when viewed from the top of a refrigerated cabinet.

Cartons are manufactured by American Can Co.

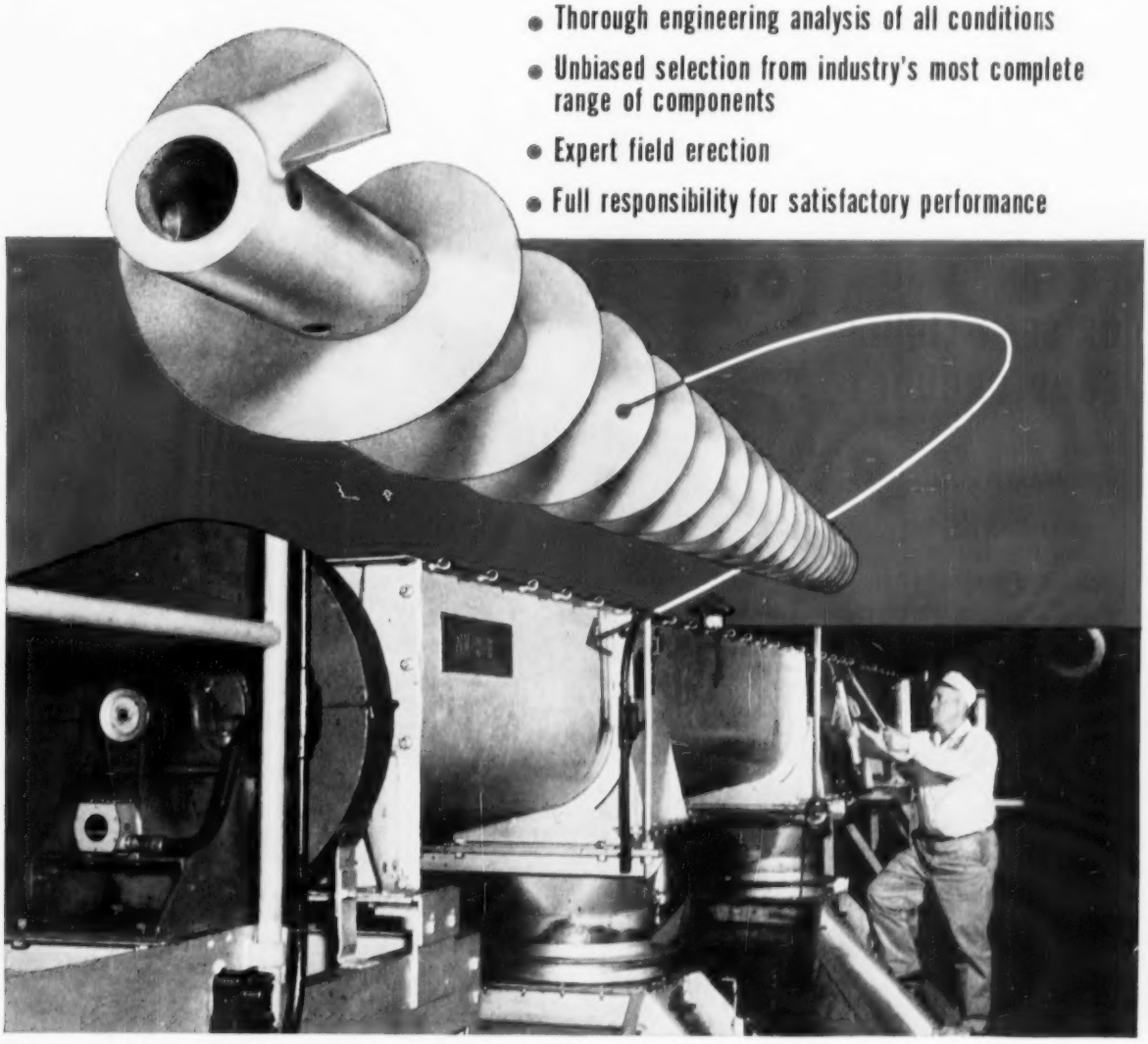
Circle 26A on Reader Service Card

TEA SAMPLETTES are cellophane overwrapped trays holding five or ten sample packages of tea. Each box holds a packet of loose tea making four cups. The samplettes are being marketed by Spice Islands Co., South San Francisco.

Here's why a Link-Belt engineered screw conveyor installation means

a better-working system ...less work for you

- Thorough engineering analysis of all conditions
- Unbiased selection from industry's most complete range of components
- Expert field erection
- Full responsibility for satisfactory performance



FROM design of equipment to operation, you leave nothing to chance when you leave everything to Link-Belt's complete screw conveyor service. Whatever your needs, Link-Belt can engineer a system to meet them exactly . . . if desired, will handle entire erection and accept full responsibility for placing your system in operation.

Included in Link-Belt's full line of components are 17 basic screw designs, available in a variety of metals. Each offers Link-Belt's exclusive Quik-Link feature that permits fast, easy removal of any conveyor screw section or hanger without disturbing other components. An equally complete line of troughs, ball and babbitted bearing hangers, trough ends with ball bearing flange blocks and trough end seals, couplings, gates, spouts, and drives makes Link-Belt your convenient, one-source supplier for all your requirements. Ask your nearest Link-Belt office for Data Book 2289.

LINK-BELT

14.707

SCREW CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

For more data, circle this page number on card at back →

A DROP OR A STREAM AT THE TOUCH OF A FINGER!

with Precision's new valve and spout

FOR ANY LIQUID OR SEMI-LIQUID FOOD PRODUCT

because...

THERE IS NO PRODUCT DETERIORATION

The hermetic seal is maintained until the product is completely used.

THERE IS NO REFRIGERATION NEEDED

An inert propellant means no oxidation . . . the product stays as packed.

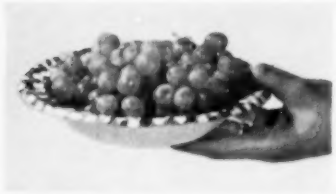
PACKAGING **DISTRIBUTING** **STORING** **SELLING**

PRECISION

Precision engineers would like to show you how your product can be successfully packaged in a non-aerated pressurized container . . . The one container with built-in sales appeal. The one container with a proven impulse-sales appeal that guarantees big turnover. Inquire today on your business letterhead, there's no obligation, of course.

PRECISION VALVE CORPORATION **700 Nepperhan Avenue Yonkers, New York**

Packages & Products



PLASTIC-COATED paper bowl is now available to fruit and nut packers. Used with a transparent overwrap, the bowls add a re-use value important in impulse sales. Made in three stock designs, the bowls can be printed to order. Supplier is Fonda Container Co.

Circle 29A on Readers Service Card

Entree-Style Wieners

A new size for skinless frankfurters is keyed to on-plate rather than in-a-bun serving. Used by Armour & Co. for its popular line, the new wieners are 3 in. long instead of the standard 5¼ in. Diameter is 1⅛ in. as opposed to the conventional ¾ in.

The Armour franks are packaged 5-7 in a 12-oz. carton with transparent overwrap.

The meat packer reports that the new frankfurter is aimed at satisfying a retailer demand for "something different".

New Product Shorts

Frying Medium for institutional use is Procter & Gamble's all-vegetable Frymax. Package is a 5-qt. can.

Wheat Germ Cereal called Sugar 'N Honey is distributed nationally by Kretschmer Corp.

Spaghetti Dinner by Kraft Foods is carton of spaghetti with enclosed pouches of parmesan cheese and sauce mix.

Instant Espresso coffees have been introduced by Martinson's Coffee under Jomar label, also by Ehlers under their own label.

Home-Made Brioches are new product of Pepperidge Farms. The brown and serve product is packaged six to a carton.

Apple Dessert kit introduced under Py-O-My label contains can of sliced apples, crumb topping, and crust mix. Package is a carton.

Orange-Apricot juice developed for Del Monte line will soon go into national distribution.

Eight Flavors of ice cream are combined in Meadow Gold's Holiday Fruit Ice Cream. Maraschino cheeries and pecans are included in the special Thanksgiving and Christmas flavor.

the BIG difference
BETWEEN
AVERAGE and OPTIMUM
MACHINE PRODUCTIVITY

...STERLING ELECTRIC POWER DRIVES

Machinery manufacturers and users in virtually every industry report outstanding performance achievements with Sterling Electric Power Drives ...achievements in greater productivity, in greater machine versatility, in lower maintenance cost, in rugged dependability...achievements that give dollars and cents proof that Sterling Electric Power Drives can make the *big* difference between average and optimum productivity of your machinery and equipment.

STERLING SPEED-TROL VARIABLE SPEED MOTORS

STERLING SLO-SPEED GEAR MOTORS

STERLING CONSTANT NORMAL SPEED MOTORS

STERLING MULTI-MOUNT SPEED REDUCERS

Write today for Bulletin No. 185. Discover the big advantages Sterling Electric Power Drives can bring to your plant.

Sterling offers a wide range of Electric Power Drives of advanced design—variable or constant speed—with manual or automatic controls.

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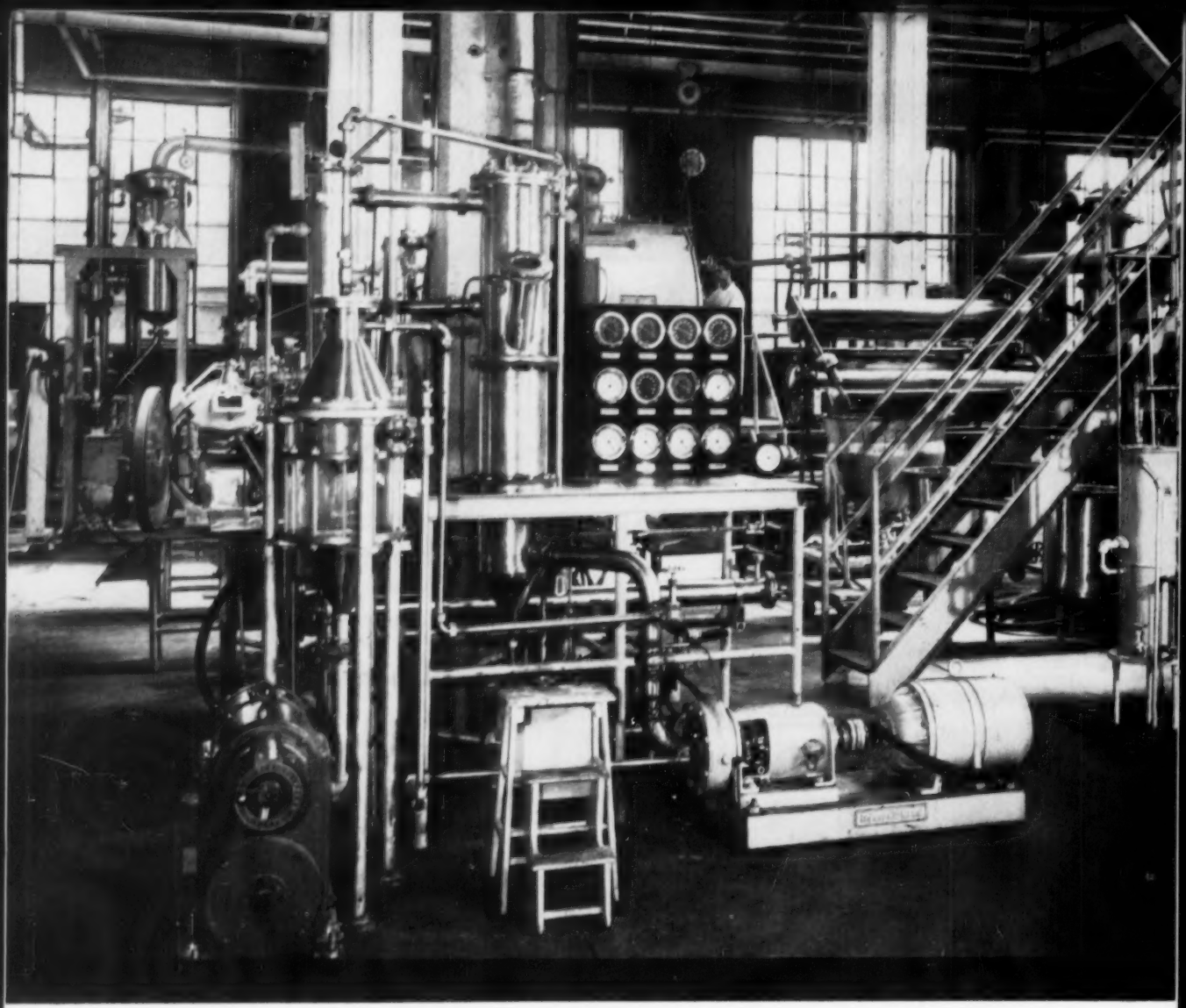


Buflovak puts the best equipped processing lab at your service

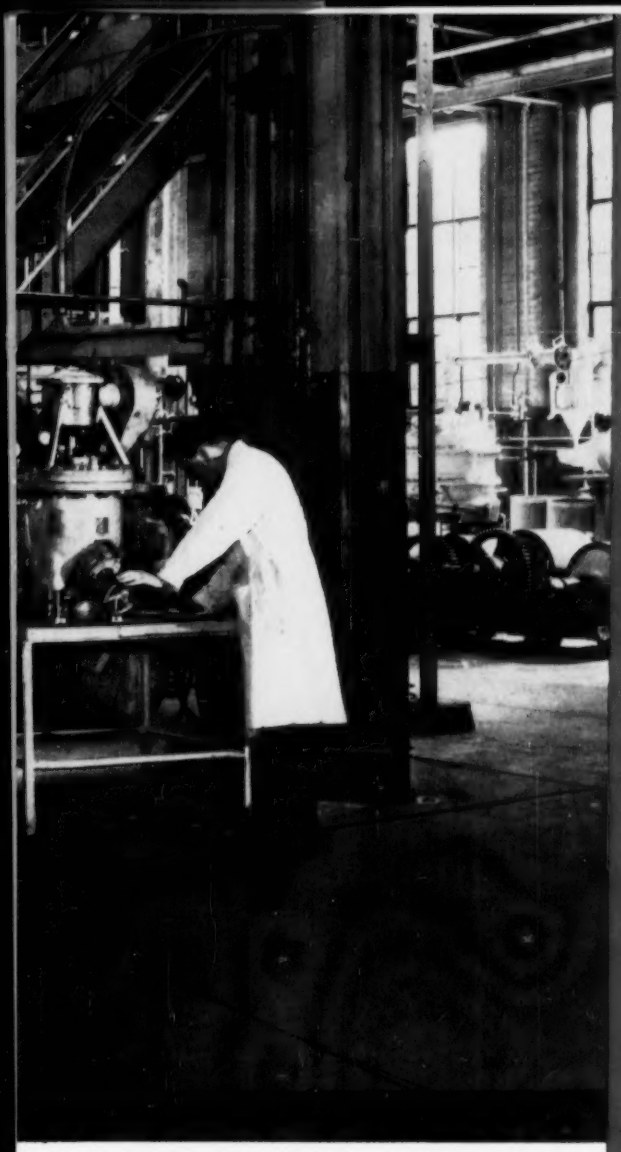
Buflovak laboratory has solved over 7000 processing problems. This thorough research, conducted by an experienced staff of skilled engineers, has lead to many new methods now in use in the chemical, food, pharmaceutical and allied fields.

Buflovak's research and development center is the world's most completely equipped processing laboratory for investigating drying, evaporation, extraction, impregnation, crystallization and other related processes.

Here you can obtain accurate performance data on your product . . . examine your process efficiency . . . explore by-product possibilities. Whether you test a few beakers of precious material or run tank car quantities on a round the clock production scale, you get proof positive on the operation.

Buflovak laboratory is a complete processing plant equipped with a variety of small experimental units and semi-plant size equipment. New models are continually installed, so that the testing apparatus is always the latest obtainable.

Constant research makes Buflovak designs the most modern in the field, the most dependable in operation. Because Buflovak builds a complete line of processing equip-

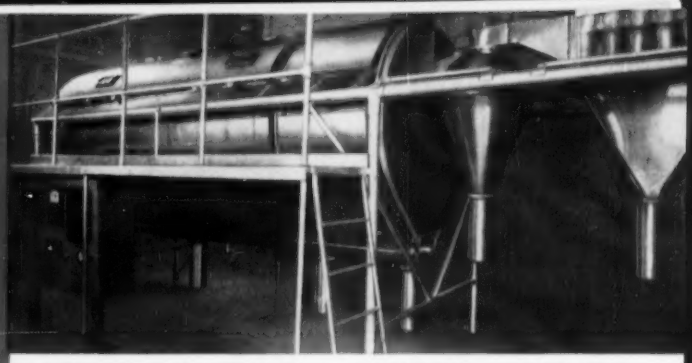


▲ **Testing evaporation.** This Forced Circulation Evaporator (above at left) is used to concentrate heavy liquids. Buflovak evaporators are designed to fulfill a particular application . . . to provide a virtually complete recovery of solids . . . to produce a finished product suited to market and process requirements.

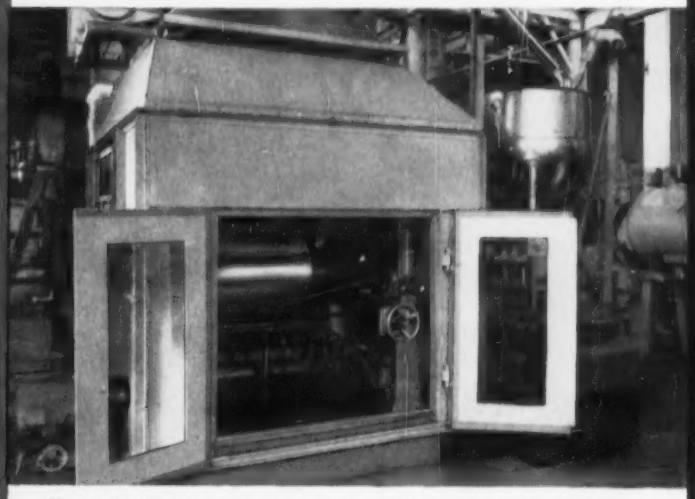
ment—such as evaporators, dryers, kettles, autoclaves and flakers—it can impartially recommend the units that sound research indicates the best.

Take advantage of Buflovak's 50 years experience. Your engineers are invited to consult our staff without obligation.

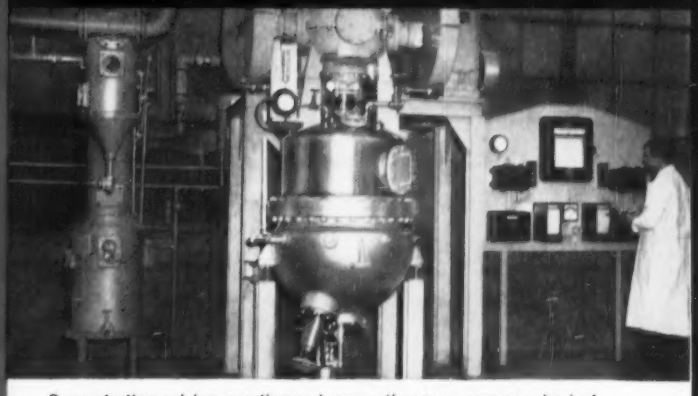
For details, write for Catalog 358.



When experimenting with high recovery of solids, this pilot plant Spray Dryer is often used. Instantaneous drying from liquid to dry product provides new product characteristics, opens up new markets for chemical, pharmaceutical and food manufacturers. Noted for its low initial cost, Buflovak Spray Dryers assure low maintenance costs.



How to handle dusty or toxic materials is another aspect of Buflovak research. Dyes, herbicides and other materials can cause serious dust and fire hazards, often release toxic solvents. Buflovak enclosed Double or Twin Drum Dryers have been found to offer complete safety against these dangers, and to permit the reclaiming of important solvents.



Concentrating, mixing, reacting and many other processes are checked in this 50-gallon Stainless Steel Processing Kettle. Tests can be run at atmosphere, under pressure or at full vacuum. It is equipped with a double motion agitator with separate variable speed drives for each agitator element.

BLAW-KNOX

BLAW-KNOX COMPANY

Buflovak Equipment Division

1631 Fillmore Avenue, Buffalo 11, N.Y.

Titanium Tubing

For processing lines carrying fluids of an extremely corrosive nature – look to *Contour Trentweld* titanium tubing for reliable service.

This titanium tubing is completely uniform throughout any cross-section. The weld zone is free from bulging weld bead because Trent's exclusive process – performed with the weld area at the bottom – forms the molten weld metal into the shape of the tubing.

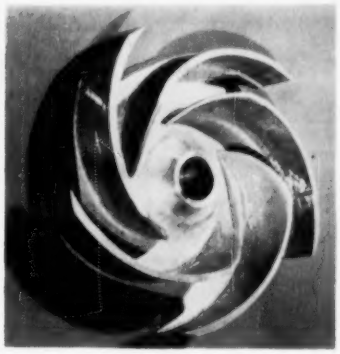
And, with titanium, you get the unique advantages of a tubing that's strong as steel but 44% lighter . . . virtually immune to a broad spectrum of corrosive materials . . . entirely free from stress-corrosion cracking.

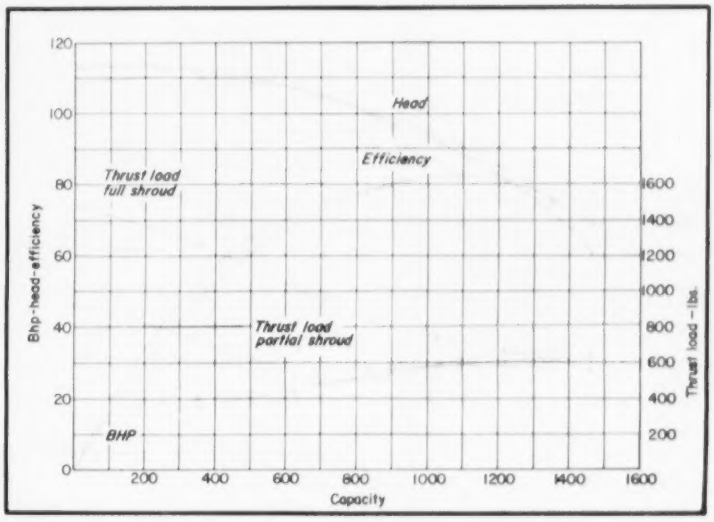
So, next time you need a strong, light, extremely corrosion-resisting tubing – try *Contour Trentweld* titanium tubing. And remember, it's made by Trent – tube mill specialists.

CONTOUR TRENTWELD®

Stainless and High Alloy Welded Tubing

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of Crucible Steel Company of America)





Reduced Impeller Area Cuts Load on Pump Bearings

Tests of partial shrouds on process pumps have revealed that thrust loads can be cut approximately 35% for operating conditions at or near shut-off. This reduces, in turn, the possibility of thrust bearing failure when the pump is operated near the shut-off condition.

Many batch operations are run so close together that they approach a continuous operation. And pumps used in conjunction with them are often allowed to run at shut-off between batches. Such an operation creates additional axial and radial thrust loads not usually anticipated in the original design of the pump.

Several methods are available to the designer which will offset or reduce these forces or their effects. Mounting the impeller between bearings and increasing shaft diameter will give greater shaft stiffness to resist deflection. A double volute design can be obtained by locating a second tongue 180 deg. from the first, thus providing balanced pressures.

A double suction impeller, with its inherent hydraulic balance at all points, is used in horizontally split case pumps and will overcome axial thrust for the most part.

With an end suction overhung impeller design, the shaft can also be made heavier. This requires a single suction impeller and unbalanced axial thrust is present. However, some of the force can be eliminated by reducing some of the area. The photo above illustrates a single suction open type impeller with some of the rear shroud area removed.

Curves at right reveal the effects of this partial shroud removal. In each size tested, axial thrust at shut-off was reduced to approximately 65% of the former value. At full capacity, the partial shrouds do not drastically affect the thrust load, which now approximates the value obtainable with a full shroud.

Partial removal of the shroud gives slightly less guidance to the fluid as it leaves the impeller. Efficiency at reduced capacities is lowered slightly. However, process pumps are usually of low power ratings, and the difference in efficiency is negligible.—*Chester McFarland, De Laval Steam Turbine Co., Trenton, N. J.*

Angle-Iron Pallet Supports

To take advantage of the "air rights" in our frozen foods warehouse we use special devices to support pallet loads. These are then piled three-high without damage to the lower cartons.

The supports are lengths of angle-iron with welded-on end-plates. Four of these are placed at the corners of the lower pallet (see photo) and lashed up tight. Two more tiers can then be safely piled on top of it.—*Webster McAllen, Plant Superintendent, Coastal Foods Co., Cambridge, Md.*

CUT OUT AND FILE

it's a question of

Taste...

with

VICTOR BELTING

Your business is to capture the public taste. Ours *isn't*. Instead, we make sure that no taste—no undesired flavor from the belting itself is imparted to the foods produced. Proper belt construction makes cleaning easy, preventing any day-to-day carry-over of flavors from foods handled.

To *really* make sure, our research department keeps a careful, continual check not only on Victor belting construction, but also on actual performance under all operating conditions. That's why—with complete confidence—we recommend for your food handling:

VICTOR SUPRENE . . . special-woven cotton duck belting thoroughly impregnated with an exclusive neoprene compound. Waterproof, highly resistant to grease and most food chemicals, smooth-surfaced, and easily cleaned.

VICTOR 475...highest quality, solid-woven cotton belting impregnated and coated with a special neoprene compound. Developed for use where laboratory cleanliness is a *must*. Washable with hot water or steam, resists rancidity and deterioration.

For food handling the modern, sanitary way select from

A COMPLETE LINE including: • Neoprene Belting • Balata Belting • Solid-woven Belting (raw, impregnated, coated) • Canvas Stitched Belting • Specialties.

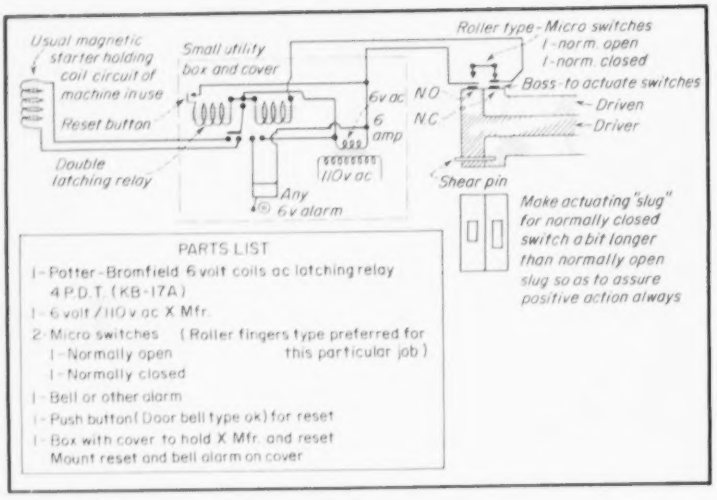
Victor Balata & Textile Belting Co.

53 Park Place, N. Y. 7

300-6 W. Hubbard St., Chicago 10

Factory: Easton, Pa.

Practical Ideas


Usual magnetic starter holding coil circuit of machine in use
Small utility box and cover
Reset button
Double latching relay
6v ac
6 amp
110v ac
Any 6 v alarm
NO
NC
Roller type-Micro switches
1-norm. open
1-norm. closed
Boss-to actuate switches
Driven
Driver
Shear pin
Make actuating "slug" for normally closed switch a bit longer than normally open slug so as to assure positive action always
PARTS LIST
1-Potter-Bromfield 6 volt coils ac latching relay 4 P.D.T. (KB-17A)
1-6 volt / 110 v ac X Mfr.
2-Micro switches (Roller fingers type preferred for this particular job)
1-Normally open
1-Normally closed
1-Bell or other alarm
1-Push button (Door bell type ok) for reset
1-Box with cover to hold X Mfr. and reset
Mount reset and bell alarm on cover

Stops Machine and Sounds Alarm When Shear-Pin Snaps

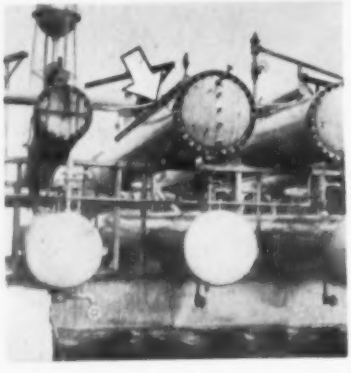
Before installing an automatic safety stop and alarm circuit (see sketch) it was possible for as many as 50 cans of spoiled product to pass into our vertical conveyor after a shear pin snapped. The resultant delay cost $100 to $150 at P. F. Beich Co.

Now, however, three cans at the most coast through the machine before it stops, and an alarm draws the operators attention to the stoppage. Also, the unit cannot be restarted until the reset has been actuated. Therefore someone must inspect the machine before going ahead.

Anyone with a little "know-how" can make this sort of an installation. Timing the two Microswitches is the only important adjustment and this is easily done.

Two bosses on the driver and driven members of a machine initiate the action. These are set to simultaneously actuate a pair of Microswitches (one normally open and one normally closed) so that one will always be closed. However, when the shear pin breaks the members will separate allowing both switches to open at the same time. This deactivates the double-latching relay. The relay contacts open the holding coil circuit (stopping the machine), and close the alarm circuit.

To start the machine (after making necessary repairs) the reset button is pressed. This allows juice to pass through a transformer that is powerful enough to pull the latching coil in for reset with the bell ringing. The alarm stops ringing and the starter circuit is closed.—*A. E. Wolff, Bloomington, Ill.*



Lawn Hose Cools Condenser

In a highly-industrialized section of New York the ground water temperature may run 80F. in the summer. This increase over the natural temperature of 54F. is due to the return of used water to the ground from factories. Such replenishment is required by the state in order to prevent seepage of sea water into the ground.

The high temperature makes it difficult for water-cooled condensers to remove the proper amount of heat from the refrigerant at the

Label inventories
lowered—with the Tickometer

Label shortages can stop a production line or slow deliveries, so you play safe and order enough. Labels fill up stockrooms, steal storage space. Changes in package content or product specifications make labels obsolete . . . Hundreds of companies have found imprinting with the Tickometer lowers label inventories, prevents waste and reduces label costs.

- Keep on hand only basic label forms and sizes. With the Tickometer you can imprint designations as needed . . . type, grade, weight, size, color, date, code, etc. Labels can be prepared for daily production, batch limits or special assortments—with consequent saving of inventory, printing costs, and wasted labels.
- The Tickometer prints up to 1000 pieces per *minute*, can produce a lot of labels in a hurry. Printing surface up to $2^{3}/_{16}$ by $^{7}/_{8}$ inches, with close register on most weights and finishes of paper or light card stock. Takes sizes as small as 1 by 2 inches, up to 15 by 15 inches, according to the model. It feeds and stacks automatically, and *counts so accurately banks use it to count currency!* Makes a predetermined count, records part or full totals, with optional consecutive numbering.
- The Tickometer has many other applications; can be used to mark, endorse, stamp, sign, or cancel checks, cards, coupons, tickets, tags, sales slips, forms, etc. . . . With amazing time savings over hand-stamping. It can be rented or bought. There are 302 PB service points, including 107 branch offices, coast to coast.

Call the nearest PB office for demonstration. Or send coupon for free illustrated booklet, and user case studies.

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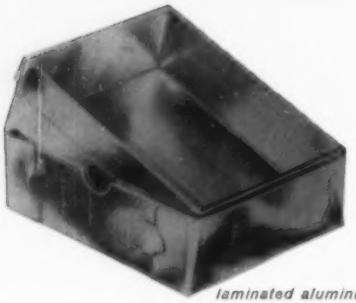


laminated aluminum frozen food carton

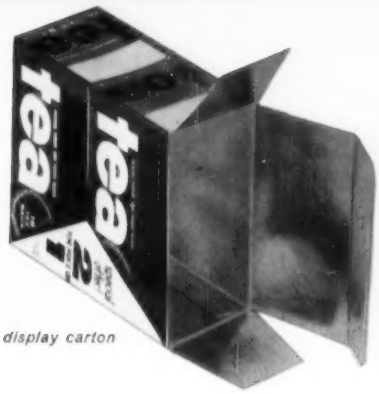
laminated aluminum dinnerware

Another Continental

rigid aluminum foil container

aluminum spot crown

rigid aluminum foil tray



laminated aluminum display carton

aluminum package-

CANS

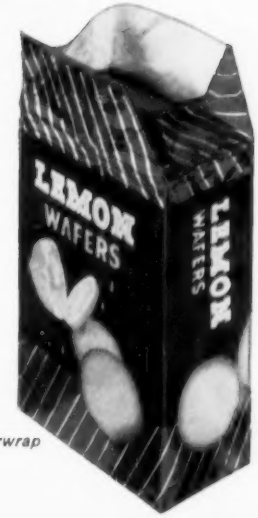
Working with aluminum isn't new for Continental. Over the years, Continental has introduced aluminum packaging in many forms —from closures and overwraps to rigid foil containers and laminated corrugated cartons. So it's only natural for Continental to be in the forefront in offering aluminum *cans*.

For complete information on sizes and styles, contact your nearest Continental sales representative . . . or write to any of the Continental divisional offices listed below.

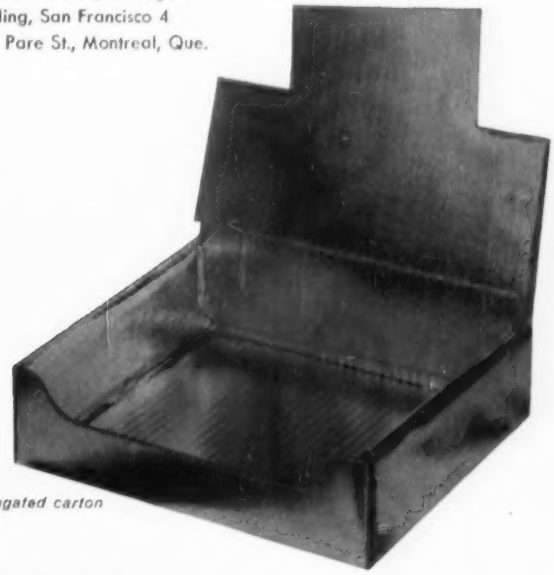
QUALITY Continental SERVICE

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4
Canadian Division: 5595 Pare St., Montreal, Que.



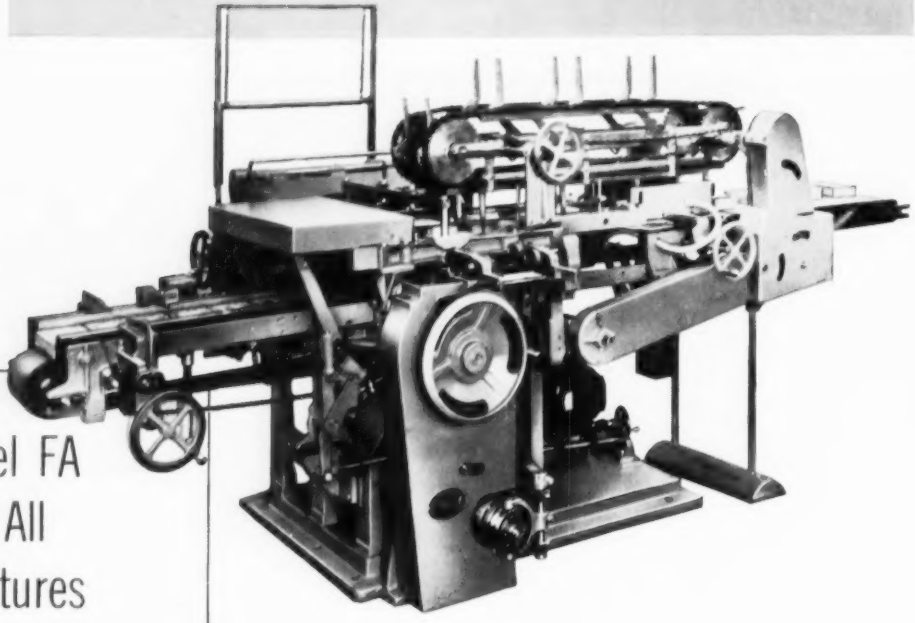
aluminum foil overwrap



laminated aluminum corrugated carton

GET MAXIMUM VERSATILITY

With 100-a-Minute Wrapping Speeds



Only Model FA Gives You All These Features

Feed: Continuous chain infeed, or intermittent chain infeed to handle stacks of flat items.

End Folds: Double-point end fold is standard; reverse double-point fold, single or double-point turned-under fold, crimp seal and special folding for extension edge boxes also available.

Materials: FA glues or heat seals. It can handle waxed, sulphite or kraft paper, cellophane, glassine and reinforced foils, as well as mylar.

Paper Feed: Both roll and sheet feed available.

Attachments: Easy-opening tape, medallion and code dater attachments available.

Here's the machine that will help cut your costs with top production every day. In the Model FA, you get speeds up to 100 packages a minute, combined with the most versatile operation you can find. You're assured of better wraps, too, for packages pass through the FA in a straight line, and operations are performed without turning. Improved electric eye registration gives you the *most accurate* panel registration possible, and an automatic paper stop controls feeding.

Size ranges on the Model FA run from 2" to 11½" L, 1⅛" to 5⅝" W, ⅛" to 3½" H. Models FA-2, -3 and -4 handle larger packages. You can get full information on the many FA features by contacting our nearest office.

PACKAGE MACHINERY COMPANY

EAST LONGMEADOW, MASSACHUSETTS

NEW YORK • PHILADELPHIA • BOSTON • CLEVELAND
CHICAGO • ATLANTA • DALLAS • DENVER
LOS ANGELES • SAN FRANCISCO • SEATTLE • TORONTO

Good Humor Corp. Maspeth, N. Y. plant.

One measure that has helped here is the placing of perforated lawn sprinkler hoses (arrow in photo) over the roof-mounted units. The water spray helps cool the condensers, and the drippings lower the roof temperature by evaporation.—*FE Staff*

Swap Boards Provide Marketplace

A new employee service started a few months ago gives Staley employees a way to get rid of things in exchange for other things, or cash.

Swap boards located in four buildings carry an interesting assortment of notices for bargain hunters. Notices are screened by a Fellowship Club committee to avoid commercialism. Real estate and rental listings are avoided to keep notices down to a workable number.

Here's how the system works: The employee with something to sell or trade makes five copies of a 4-in. square notice, listing the item with a brief description, his name, phone number, and address. He sends these to the Fellowship Club office or

Let's Have Your Ideas

SEND your ideas to FOOD ENGINEERING.

We'll pay $5 to $15 (sometimes even more) for each contributed item used.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to show how it works.

We'll do the finished writing and drawing for you.

Send your idea today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

ALL FROM ONE SOURCE

Each for its special job!

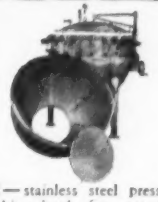
SA—streamlined balloon jacket design. Extra large diameter provides greater heating surface. Sizes 15 to 500 gallons. Constructed for steam working pressures of 40, 90 and 125 pounds.

Hamilton kettles are quality engineered, designed for greater efficiency. You save on labor and costs of operation. Each part of a Hamilton Stainless Steel Kettle is designed for longer life, rugged usage; steam jacketed kettles are faster cooking, easy-cleaning. Specify Hamilton A.S.M.E. Code mixing and cooking kettles.

SA MIX COOKER—has single or double motion agitator with or without hydraulic lift. Agitator lifts easily and smoothly out of cooker. Sizes 30 to 500 gallons.

CW—designed to process batches up to 150 gallons. Positive worm gear. Handwheel gives control of capacity loads while tilting. Large diameter kettle gives fast even cooking.

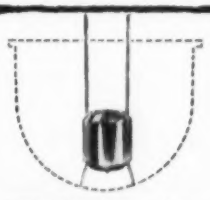
CW MIX COOKER—a hydraulic lift tilts agitator smoothly and easily out of tilting kettle. Available for 40, 90, 120 pounds steam working pressure.



PC—stainless steel pressure cooking kettle for meat and poultry processing. 90 p.s.i. in jacket and 15 p.s.i. in kettle. Quick opening latches. Top is lifted by eccentric lever. Sizes 30 to 250 gallons.

HV—vacuum cooker from 150 to 500 gallons. Hinged manhole provides access to the inside. Available with a mixer—circulator can be installed to increase heat transfer and agitation.

VT—vacuum cooker has no equal for small batches. Tilting top, easy loading. Sizes 30 to 150 gallons. Jacketed for 90 p.s.i. steam working pressure.



CIRCULATOR—stainless steel steam immersion heating unit installed in kettles of any size or shape. Gives heating surface at the center of kettle. Creates thermal agitation. Speeds up cooking 45%.

SB—shallow type kettle with balloon jacket. Streamlined. Constructed for working pressures of 40, 90, and 125 pounds. Sizes 15 to 350 gallons. Larger size kettle to meet specifications.

A—general purpose steam jacketed kettle used in processing food, drugs, and chemicals. Full ⅔ jacketed. 15 to 500 gallons. Available in Type 316 stainless steel or nickel. Larger sizes to specifications.

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HAMILTON

Kettles

DIVISION OF BRIGHTON CORP.

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CINCINNATI 4, OHIO

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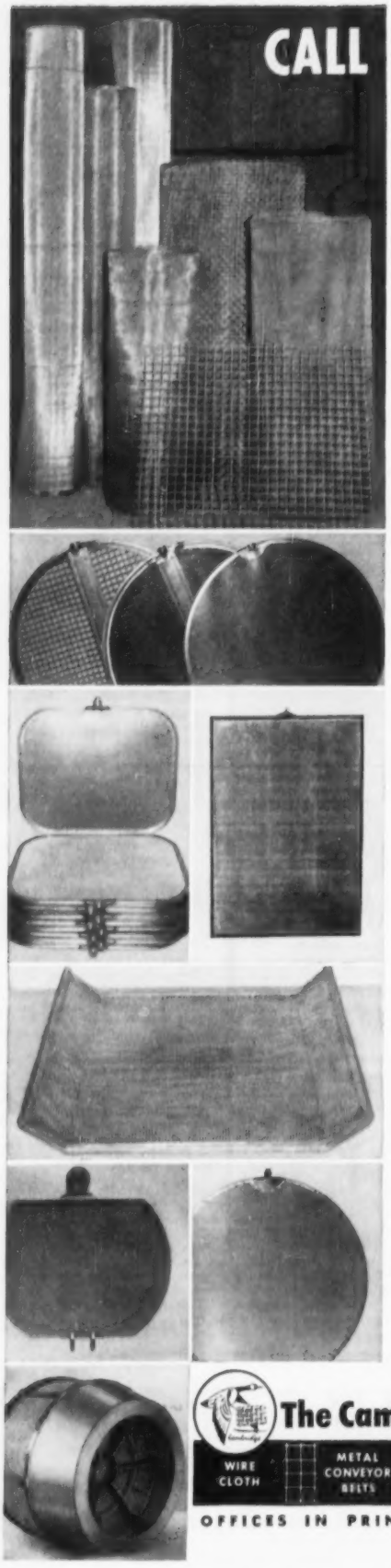

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in BULK or FABRICATED PARTS

COMPLETE LINE

Nine weaves ranging from the finest to the coarsest, in any metal or alloy.

ACCURATELY WOVEN

Individual loom operation and careful inspection just before shipment assure accurate mesh count and uniform mesh size.

PROMPTLY DELIVERED

Most bulk orders are shipped immediately from stock. If your needs are for less frequently used types, we'll schedule our looms to fill your order without delay.

In fabricating parts . . . filter leaves, strainers, sizing screens . . . we'll work from your prints or draw up prints for your OK.

LET US QUOTE on your next order for wire cloth. Call your Cambridge Field Engineer—he's listed under "Wire Cloth" in the Yellow Pages of your 'phone book or write for FREE 80-PAGE CATALOG and stock list.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

Department Q, Cambridge 12, Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Practical Ideas

Plant Protection by Wednesday noon.

The Committee meets each Wednesday afternoon and OK's new notices, which are posted on the boards by Plant Protection.—*Staley Journal, publication of A. E. Staley Mfg. Co., Decatur, Ill.*

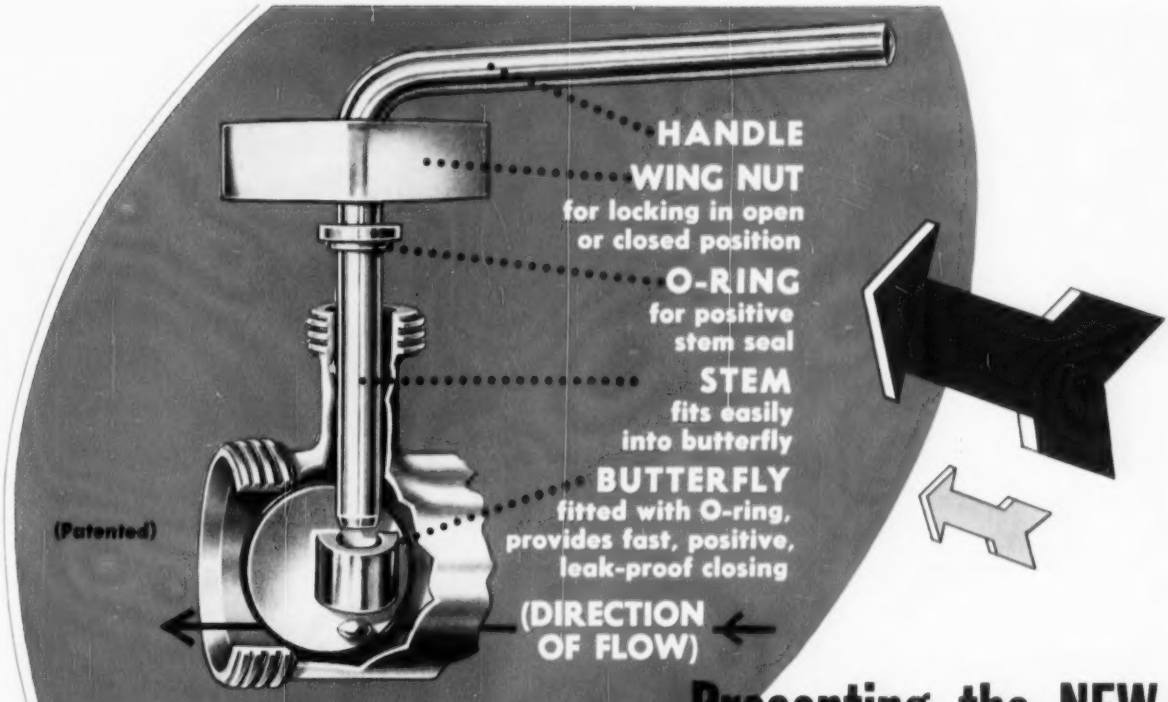
Dumper Speeds Handling

This new hydraulic loader, used to dump grapes from gondolas to trucks in Delano, Calif., vineyards, has effected large manpower savings.

Formerly picked grapes were put in boxes and the boxes emptied into trucks that take them to wineries. Now, pickers empty them into gondolas that hold up to three tons. These are hauled by tractor to the loader (photo) which lifts and dumps them into waiting trucks.—*FE Staff.*

Saving Floor Space

Even office areas have gone "overhead" at many modern plants, resulting in worthwhile savings in floor



Presenting the NEW TRI-CLOVER INLINE *Butterfly* VALVE

TRI-CLOVER Division now presents a new concept in sanitary valve design for use in dairy and food processing lines. Of Type 304 stainless steel, this new line of Tri-Clover Butterfly Valves is manufactured to the usual high standards that have made Tri-Clover fittings, valves and pumps the mark of quality throughout the dairy, beverage, food and chemical industries.

Presently offered in 1½-inch and 2-inch O.D. tube sizes, these new quick-action, leak-proof valves are designed for use with both Standard sanitary threaded ends, as well as in "Tri-Clamp"® types. Valves have same end to end dimensions as regular sanitary plug valves and therefore are interchangeable in existing lines.

See your nearest Tri-Clover Distributor or write for BULLETIN BL 457

10 IMPORTANT ADVANTAGES:

1. Light Weight
2. Simple, Fast Installation
3. Quick, Easy Cleaning
4. All Parts Interchangeable Between Valves
5. Minimum of Parts
6. Lower First Cost
7. Less Maintenance
8. Longer Life
9. Less Susceptible to Damage
10. No Plugs to Replace —No Lapping Required

LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

S657

In Canada: 37 Hanna Avenue Toronto 3, Ontario

TRI-CLOVER

Export Dept.: 8 So. Michigan Ave. Chicago 3, USA Cable: TRICLO

Tri-Clover 2-port Butterfly Valve. Shown with Tri-Clamp ends. Available in 1½" and 2" sizes.

Tri-Clover 3-port Butterfly Valve. Shown with Standard bevel seat ends. Available in 1½" and 2" sizes.

Tri-Clover 3-port Butterfly Valve. Shown with Tri-Clamp ends. Available in 1½" and 2" sizes.

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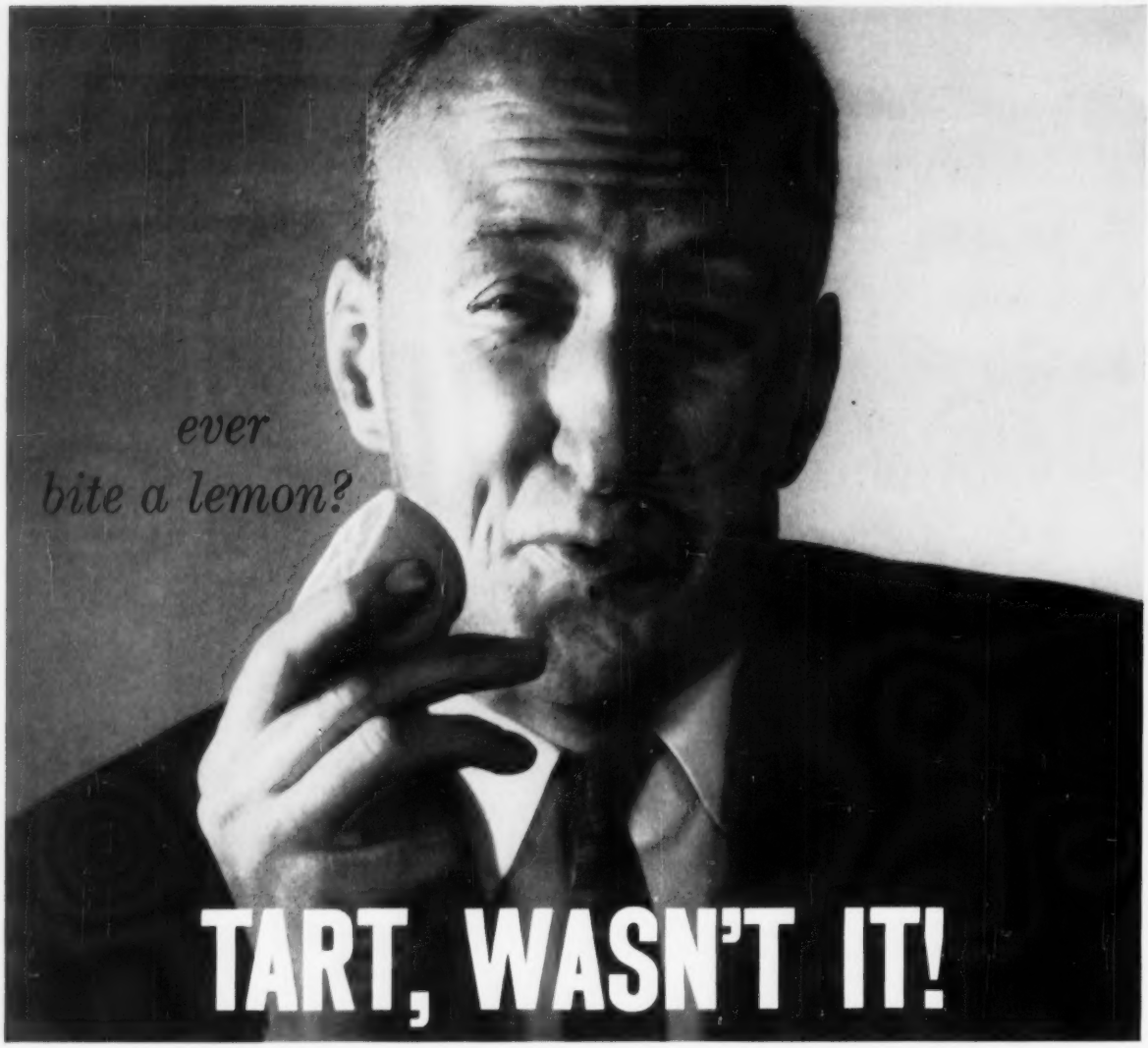


Tartness is what makes really good lemon pie filling. Like the kind made by Brechet & Richter Co. of Minneapolis, makers of top-quality fillings for the baking industry since 1909. Last year they decided to add even more tangy richness to their lemon filling. It made the filling more popular then ever. But—they created for themselves a real problem: the steel containers they were using couldn't stand up under the increased lemon tartness.

Inland Steel Container Company came to the rescue with a special food lining that is highly resistant to this increased tartness. The problem was solved. Today, Brechet & Richter's Inland "protection-eered"* steel pails carry their improved pie filling perfectly.

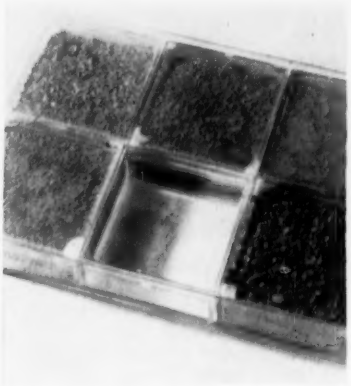
What's your problem? Safeguarding quality? Protection in transit? Inland Steel containers with a special protective lining may be the answer. Is your package delivering the quality you ship? Find out how Inland Steel containers put quality control into your package. Write Bob Boecher, Department 338G.

**the right container, with the right lining for your product.*

INLAND STEEL CONTAINER COMPANY Division of Inland Steel Company · 6532 South Menard Avenue · Chicago 38, Illinois · Plants: Chicago · Jersey City · New Orleans · Cleveland and Greenville, Ohio. *Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.*

space as well as improved supervision.

An example is the Plymouth, Mich. plant of The Rapid-Standard Co., Inc. where elevation of the shipping supervisor's office (photo) saved 120 sq. ft. of valuable floor space. Similar features are now being incorporated in food plants.—*FE Staff.*



Quick-Checker for Size Of Ground Particles

To insure giving our customers a uniform quality of ground coffee, we made up 3,000 coffee grind indicator kits (photo). These are used by district managers and other personnel to check the mills in our stores.

The kit consists of six small plastic boxes arranged in two rows of three inside a larger plastic container. Five of the boxes are filled with samples of coffee, each one representing a different grind (open pot, perc, drip, extra fine, and pulverized).

To adjust a mill the manager simply grinds a batch at one of the standard settings and places a sample of the ground coffee in the sixth box. He then matches this sample with the others. By visual examination he can see if the mill is operating properly. If it isn't (particles are too coarse or too fine) a simple adjustment is made with a screwdriver. Then the test is repeated.

The sample grinds placed in the indicator were obtained on a master grinder that is set according to National Coffee Assn. standards.

This sort of comparison test can be used for quality control of such factors as particle size, color, separation, and impurities on other

Use

RHOZYME

Proteolytic Enzymes to hydrolyze protein

RHOZYME purified food-grade enzymes serve as valuable aids in processing a wide variety of protein-containing material. If you want to make meats tender but not mushy, modify whey protein for cheese spreads, or prepare protein hydrolyzates, RHOZYME natural enzymes are efficient and economical. The food engineer will also find RHOZYME enzymes useful in processing a wide variety of proteinaceous wastes, either to convert them to useful products or to dispose of them economically.

Supplied as dry powders with excellent storage stability, RHOZYME enzymes are carefully standardized to give uniform, reliable performance.

If you want to improve the processing of protein we will be glad to show you how the *specific* and *controlled* action of RHOZYME enzymes can help. Write Dept. SP for full information.

RHOZYME *is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.*

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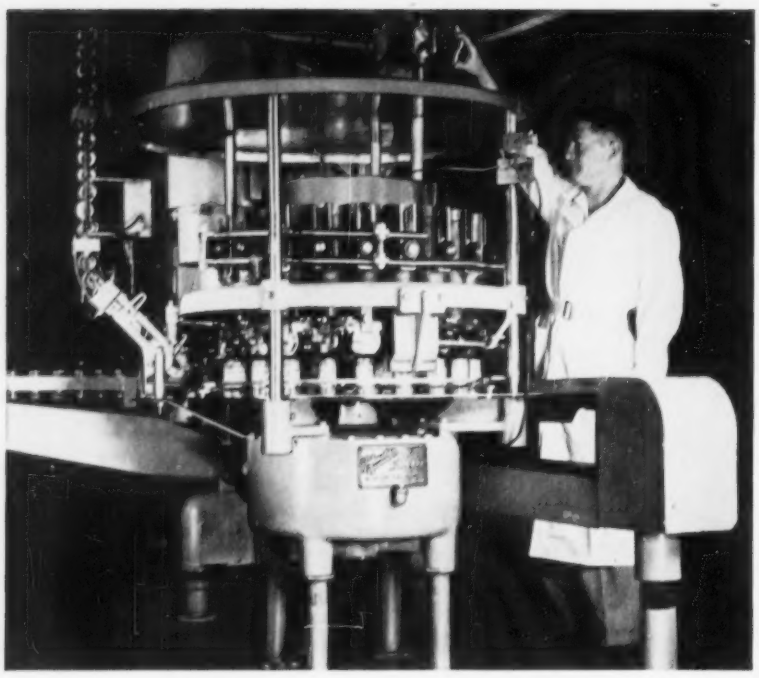

Do you sacrifice accuracy for faster filling?

Look then to Pfaudler and the rotary piston fillers with which there is no sacrifice of accuracy or speed when you fill foods and other viscous and semi-solid products.

With Pfaudler rotary piston fillers you can choose filler speeds from 40 cans a minute to as high as 1000 cans a minute, and still get the extra features and accuracy that weren't considered possible a few years back.

FEATURES LIKE THESE:

Accuracy to 1/10 ounce. Rated to fill within specified tolerances—usually within ± 1/10 ounce. *No container-no fill* control on every machine.

Sanitary, easy to clean. One man cleans within 30 minutes, even on largest machines. Slide one-piece valves out. Lift simple ring-free pistons out. That's all.

Low maintenance costs. Just four primary wearing parts—piston rollers, valve rollers, valve trip cams and wear pads on valve locks...each part durable, low cost and easy to replace.

There is a range of five Pfaudler piston fillers to meet your viscous and semi-solid liquid needs.

Check the coupon for more information on these fillers plus other integrated process equipment from Pfaudler.

THE PFAUDLER CO., Dept. FE-127, Rochester 3, N. Y.

Please send bulletin on ☐ **Rotary Piston Fillers**
and this other Food Processing Equipment by Pfaudler:

☐ Titan Superjector
☐ Heat Exchangers
☐ Tanks—Mixing and Storage
☐ Conical Dryer-Blenders
☐ Evaporators—Film Type

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Company _____

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Practical Ideas

products.—*Robert C. Brink, Laboratories, Division, Kroger Food Foundation, Cincinnati, Ohio.*

Reversing Woven Wire Belt

Feeding two lima bean packaging machines, one at a time is the function of a woven wire belt (see photo) at the Coastal Foods Co., Cambridge, Md.

The belt (installed by Cambridge Wire Cloth Co.) is a short, reversible model with chain-link borders. Reversibility is its key feature, though. By a flick of a switch incoming beans can be diverted from left to right or vice versa, depending on which of two packaging units is being used.—*FE Staff*

Identifies Room Test Lots

Adjacent to doors leading into testing and product controlling cold and warm storage rooms at Durkee's new lab, Chicago, are plastic holders and guides for roll-mounted paper.

These units make it convenient for technicians to identify tests going on in the rooms. For instance, a typical pencilled legend on a pad might read: Cake stability test with cycling at 30-90F., 12 hr., start 10 am., 10/8/56. Shortening tempering tests are also run in the rooms.

This lets personnel know what's going on in the rooms without disturbing the samples.—*FE Staff.*

Painting Up High: For those ceiling and upper wall painting jobs a spray gun fitted with an extension arm allows the painter to remain standing on the floor.

1. Gummy Products
2. Greasy Products
3. Caustic Soda
4. Fertilizers
5. Dehydrated Foods

Now you can get new Alcoa foil in multiwall bags tested and approved for big savings in bulk packaging

These low-cost, high performance, flat-pack bags can replace drums!

By incorporating a barrier of aluminum foil, they give maximum protection against moisture, odors, gases . . . hold products never before successfully packaged in multiwall bags.

Laminated Alcoa® Foil produces bags that are resistant to acids and alkaline products . . . other laminations with high-strength papers will hold chemicals, pigments, foods, greases, bulk pharmaceuticals, and other problem products.

Four important advantages to the consumer and the packer

- Greater product protection under severe storage conditions
- Longer storage life possible
- Ease of handling, shipping and stocking
- No returnable drums to bother with—a money saver for consumer, packer, manufacturer

Contact your nearest multiwall bag manufacturer—Alcoa doesn't make multiwall bags, but supplies foil to bag manufacturers, who can design bags to fit your particular product needs. For the name and address of the manufacturer nearest you, and to get further information included in our booklet, "New Alcoa Foil in Multiwall Bags," fill in and mail the attached coupon.

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NEW!
"ALCOA THEATRE"
Exciting Adventure
ALTERNATE MONDAY EVENINGS

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Please send me the name and address of the manufacturer of Alcoa Foil foil-ply multiwall bags who is located nearest to me, and also your booklet, "New Alcoa Foil in Multiwall Bags."

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A for apple is the beginning of most primers. And apple is the first choice in flavor with most Americans, who enjoy an alphabet of apple dishes. To the distinguished family of Firmenich flavors, now enhancing many food products, is added that of Apple, captured by patient research and recreated by chemical skill. It is another Firmenich achievement, already welcomed by manufacturers who have added this popular flavor to their line of products; by others to improve those already established. Highly concentrated, stable, of the utmost fidelity and purity, Imitation Apple by Firmenich is offered with pride for your profitable use. Samples and technical data on request.

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Time to Meet Challenge of In-Stream Analysis

Within reach of the food industry is a great technical opportunity. We refer to in-stream analysis of food products and materials, coupled with automatic control.

This opportunity was pointed up at a November 16 exploratory session on the subject. Held at Rutgers, the meeting was sponsored by the university's department of food technology; the Foundation for Instrumentation Education & Research; and the food division of Instrument Society of America.

Several significant factors came out of the "pilot" session. Food industry men pointed to many quality factors that need to be measured in continuous flow. Among them are moisture, density, viscosity, fat, protein, ash, bacteria count, odor, color, and flavor.

Problems and solutions indicated

There is no doubt that quality could be improved and processing simplified by in-stream analysis. But that is not all. There's money to be saved. A dairy technologist estimated that control of density in freezing ice cream would net his company an additional $300,000 a year.

Another phase of the situation was explored by instrument men at the session. They pointed up progress and opportunities for in-stream analysis with nuclear magnetic resonance, ionizing radiation, ultrasonics, gas chromatography, color meters, and infra-red spectroscopy.

Enough has been achieved to indicate that the surface has only been scratched. But some sizable difficulties are involved.

Let's take a look at problems pointed up at the session. Food men are not thoroughly aware of what might be done with analytical instruments now available. They need further research to determine what factors can and should be analyzed to achieve the desired quality control. They are up against some processes that are not satisfactorily controllable and need reengineering. And they are afraid of the cost of in-stream analytical instruments.

On the other side of the coin are the instrument men. They naturally don't know enough about the technology of food processes to make a great variety of specific applications. And their companies can't afford to do the research and application engineering involved in most instances.

What's needed to activate progress

So the impass is all too evident. But something should and can be done to speed progress. That something is coordinated research and application engineering. But how to implement this? First step is to achieve an awareness of the problem on the part of food and instrument company managements—with a loosening of the purse strings. A second step is to center activities in the hands of a third group, such as the food research people in university, government, and independent laboratories. Maybe an industry-financed association is needed to steer the work and place the research, as in the case of Nutrition Foundation.

Certainly a national session on in-stream analytical control should be held to further crystallize the problems and indicate solutions. It is hoped that the Rutgers session will catalyze such a meeting. Very likely it will, because an activation committee has been appointed.

If held, the national session should be attended by top management men from food and instrument companies, as well as the technical people. It is management's responsibility to know the problems and the opportunities.

Nothing offers more promise of technical progress in our field.

Stainless Steel Cuts Cleaning Time and Costs

Republic ENDURO Stainless Steel shelves and conveyor belt help keep sanitary the sorting and packing of haddock fillets. Equipment fabricator is the J. D. Farasey Mfg. Company, Cleveland, Ohio. Stainless saws are made by the Biro Manufacturing Company, Marblehead, Ohio.

Blue Water Seafoods, of Cleveland, Ohio, speeds processing of frozen fish—cuts clean-up time and costs to a minimum with a battery of stainless steel saws and a stainless conveyor line.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

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Here are the facts

Frozen haddock, in blocks 10″ x 20″ x 2½″, are shipped direct to Cleveland from the Newfoundland Banks. The blocks are then cut into fillets for individual servings, by saws fabricated from Republic ENDURO® Stainless Steel. They then pass along a conveyor, also made from ENDURO, where they are breaded. Finally, the fillets are packaged for delivery to restaurants and institutions.

Easy to Clean

Like so many other food processors, Blue Water Seafoods has found that ENDURO-made equipment speeds the entire operation. Downtime between processing operations is held to a minimum because ENDURO is so easy to clean and keep clean—a feature so important to plants under continuous U.S.D.A. inspection. The need for costly scrubbing compounds is eliminated. Usually a simple washing with soap and water rids the equipment of all residue and readies it for the next operation.

No Metallic Contamination

There's never any danger of metallic contamination with ENDURO-made equipment. It never adds unwanted flavor. Never takes anything away. ENDURO'S smooth, hard, dense surface offers little foothold for contaminants or bacteria. Corrosion caused by food acids and moisture is locked out.

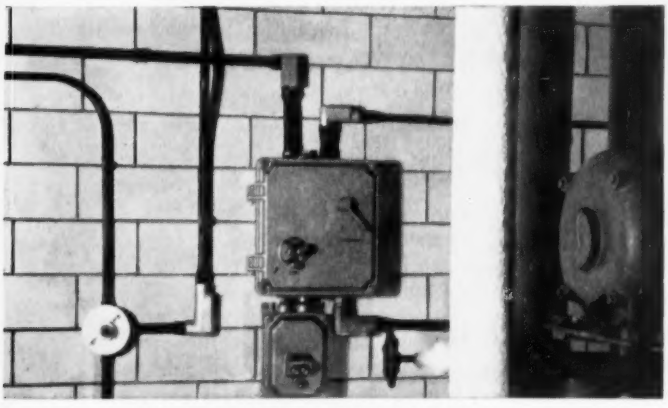
Never Needs Refinishing

Because ENDURO is solid stainless steel all the way through, there is no applied surface to crack, chip, flake or peel away. Subject it to blistering heat or sub-zero cold and it still maintains its strength, toughness and corrosion-resistance.

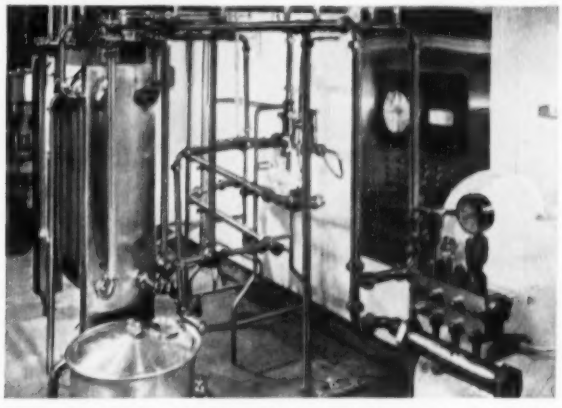
Long, Trouble-free Service

ENDURO Stainless Steel in any food processing operation means long-range economies and trouble-free service. It will take persistent abuse and still maintain its sanitary appearance.

Safeguard the quality and purity of your product, and cut costs, by using equipment made from Republic ENDURO Stainless Steel. Your equipment-supplier has all the facts. Or send us the coupon for more information.



CUT MAINTENANCE COSTS OF ELECTRICAL RACEWAYS. In this cold-storage plant, Republic Dekoron®-Coated Electrical Metallic Tubing resists the corrosive action of vapors and moisture caused by extreme temperature variations. A polyethylene coating over a galvanized finish provides double protection. Moisture-tight, corrosion-protected joints are made by wrapping the threadless connectors and couplings with plastic tape. Dekoron®-Coated E.M.T. and rigid steel conduit cost less because they last longer. Mail the coupon for more facts.



ELIMINATE CONTAMINATION AND DISCOLORATION by conveying food, dairy and beverage products through Republic ELECTRUNITE® Stainless Steel Tubing and Pipe. Fabricated from Republic ENDURO Stainless Steel, they offer the highest resistance to corrosion. ENDURO'S great strength, resistance to temperature, pressure and physical damage make Republic Stainless Steel Tubing and Pipe ideal for processes requiring fluid materials-handling at high temperatures and pressures. They will last indefinitely. Mail coupon for more data.

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I am also interested in more data on:
☐ Dekoron-Coated E.M.T.
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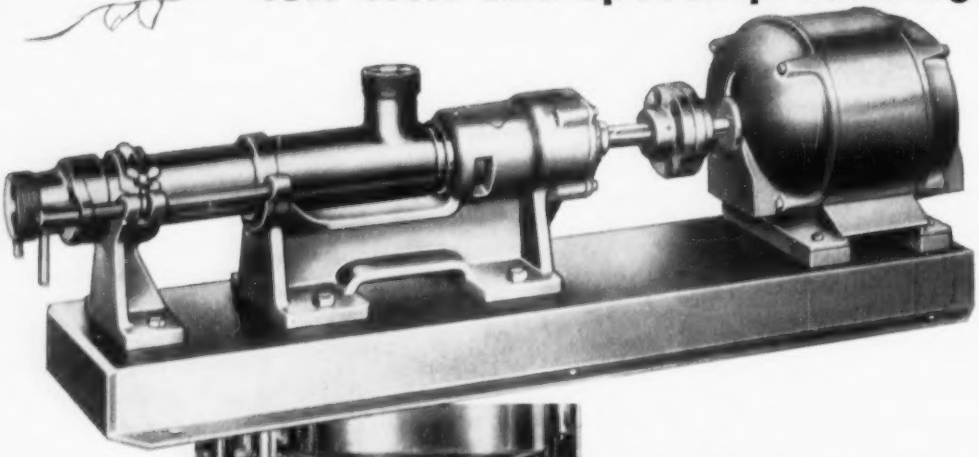
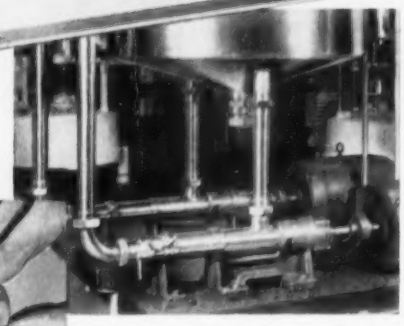
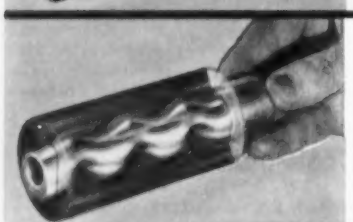
Quick cleaning

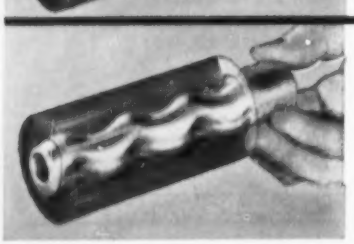
MOYNO® FOOD PUMP

cuts costs and speeds processing!









"Progressing cavity" principle . . . pumps everything from hamburger to potato salad!

With simply-designed Moynos pumping your food products, workers formerly assigned to long, costly pump cleanups can be used for other tasks! The entire Moyno unit can be quickly dismantled for thorough, effective cleaning and re-assembled in minutes. Moynos are more sanitary on the job, too. Pumping element has smooth contours which can't lodge particles where bacteria might thrive. Bearings are isolated from pumping compartment to prevent contamination by lubricant.

Moynos operate on the "progressing cavity" principle, illustrated at left. The screw-like, reversible rotor revolves in a double threaded stator, creating the progressing cavities. Material moves smoothly along, without pulsation, aeration, agitation, disintegration or contamination! All wettable parts, except stator, are stainless steel. Stator may be stainless steel, synthetic rubber, odorless bakelite or other material—depending on service. Any food product that will move through a pipe can be pumped with a Moyno—even lumpy ones like fruit cake mix!

Learn more about Moyno—the quick-to-clean pump that food can't stump. Write today for Bulletin 30-FE!

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FOOD ENGINEERING DECEMBER 1957

11 Questions Block Additive Bill

Seven points seem clearly established by government hearings. Eleven others will be controversial when hearings resume. Much hangs in the balance

IS FUTURE PROGRESS through new and improved food-product formulations to be impeded by an additives amendment to the federal food law?

Here, much depends upon the provisions written into the amendment. And what goes into it will be decided in the settling of controversial issues. Let's look at the score—

The 1957 series of hearings held by a subcommittee of the House Committee on Interstate & Foreign Commerce substantially advanced the legislative situation on the subject of food additives.

Those hearings apparently established some clear, accepted viewpoints—while disclosing where divisions of opinion occur on others.

RUSSELL S. McBRIDE
Editorial Consultant, "Food Engineering,"
Washington, D. C.

Generally Accepted Ideas

The following points are somewhat of an oversimplification, but still they are a properly significant statement of the present status.

1. Food additives, both "natural" and synthetic, have long been used and have contributed to superior food supply. Continued use, including proper new additives, is desirable for the general public benefit.

2. Preventing development of proper new additives and their use would restrict further progress. Also it would seriously reduce research incentive.

3. The use of food additives deserves control by new legislation in order to insure full public protection and safety.

Needed: Careful studies, prior to the new hearings, of "who will support what" —in order to judge tactics and gage prospects of each major point at issue.

4. Pre-testing of each new food additive should be required. This will make compulsory and general the present precautionary practice of most chemical makers marketing such materials.

5. FDA should have opportunity promptly to review all proposed new food additives. To make that review practical, the proponent of a new additive should notify FDA of his plans to use the material commercially, before initial commercial distribution of such additive or of a food containing it.

6. The Scientific Panel nominated by the National Academy of Sciences has described present testing for health and safety effects when these materials become diet components. Well recognized methods are in wide use. The skilled planning of such tests and their interpretation is necessarily based on the judgment of the professional workers involved. This, requires persons skilled and experienced in testing and interpretation of test results.

7. Any idea that absolute safety can be guaranteed is wrong. Regardless of the skill and care taken, it is almost impossible to guarantee "absolute" safety on the basis of any pre-testing. However, it is entirely practical to discover any significant hazard to public health, and thus eliminate it by proper pre-testing.

True, these seven conclusions might not get absolutely unanimous support. But they seem to be clearly established facts and findings supported by the vast majority, including virtually all well-informed persons in industry, government, and academic positions, who are acquainted with the food additive problem.

"Uncertain" Conclusions

In contrast, there are eleven other findings which, though they have quite general support, still pose some differences of opinion, usually based largely on fears, not actual experience. Here are these eleven:

1. There are very few, if any, cases in which food additives have caused any public hazard. Published opinions which claim hazards have almost always been traced to "fears" and not actual cases.

2. FDA review of proposed new food additives may or may not be supplemented by that agency's prior approval of each new formulation. At least two groups support the idea that FDA should have and should always exercise the authority of *approval before* first commercial distribution.

These two groups are: (a) Those who think that the public is "entitled" to such protection in all cases, and (b) those who appear to want the Government to take or share the responsibility for such decisions, perhaps for the legal protection of the sponsor of a new additive if it later proves dangerous.

3. A considerably larger number of industrial people appear to believe that advance approval is neither necessary nor useful. And they fear that it would occasion interminable delays in some instances, especially in "marginal" cases.

Those who seek speedy and substantial progress, as well as public protection, argue that requirement of pre-test and notification are all that is needed. Therefore this very considerable number opposes requirement of advance approval.

4. If advance official approval is not required by law, then a very simple measure amending the present Food, Drug & Cosmetic Act would suffice to give all the public-protection needed, at a minimum cost and with minimum or negligible delay.

5. Those who take this latter position appear to back the type of bill drafted for National Canners Assn. The presentation of this bill at the Committee hearings has apparently developed a great deal of strong support for that proposed amendment. Apparently most of the chemical industry will support this position. Some divisions of the food industry, especially the "Chicago Group" of food associations, appears opposed.

6. Some FDA officials strongly oppose anything that would restrict its authority for final and unrestricted prior decision in food-additive cases. They argue that this is their responsibility and, therefore, that they must also have full authority.

Probably a more important cause for this opinion is the disposition tending toward bureaucracy found occasionally in any regulatory body after a considerable period of official work.

7. One much-argued question is whether a Federal court review of FDA decisions shall merely take the form of appeals action in a Circuit Court, or whether some sort of injunctive or *de novo* (newly instituted) proceedings in the District Court is necessary. The Judicial Conference opposes any *de novo* or lower court actions. This supports the FDA desire to keep all cases as appeals in the Circuit Court.

Here, many in industry object on the ground that even a minority support for an FDA finding would be considered sufficient to confirm the FDA findings, even when the predominance of evidence has opposed such administrative decision.

8. A simple law could solve this controversy as to court review by restricting administrative actions and appeals by either party to the present adequate procedures defined in the law. Undoubtedly, it would be much easier to get a simple bill passed in 1958, if proposals of new procedure were omitted.

But FDA opposes such policy. And a few of the food companies appear to support FDA, principally those who wish to have its prior approval on each new additive proposal (see Point 2 above).

9. The question of carcinogens was brought several times into the additive-hearing discussion. Some of the more extreme critics—those opposing all additives on the ground that many of them *might* be carcinogens —were rather sharply refuted. Also, members of the Committee seemed to be impressed with the imaginative, rather than realistic, status of such charges.

Apparently, an additive bill can be passed without

any attention to the matter of cancer-forming elements —on the ground that the general additive pre-testing automatically takes care of the carcinogen question.

10. Some members of the Committee and the Subcommittee seemed rather sharply critical of FDA relative to agency practices becoming "arbitrary and bureaucratic." In at least one case, the members were also critical of delays.

Most members of the Committee recognized, by the end of the hearings, that if bureaucracy and delay prevailed to any considerable extent, there would follow both loss of progress in the use of additives and severe discouragement of research, especially by small companies.

11. Hinted at several times—but not clearly presented—was the fact that small companies suffered much more from restrictive rules regarding new additives than do large concerns.

Some members of the Science Panel pointed out that it often requires $50,000 to fully pre-test a new additive, and that two years or more are generally needed. These facts clearly handicap companies of modest size, especially those with a limited number of products.

There, then, are the 11 uncertain points.

As for what's ahead, look for the Subcommittee hearings to resume in 1958, perhaps in early February. FDA will then have the opportunity to present its case—which wasn't aired in '57.

"But—Will the People *Want to Eat It?*"

That's still Question No. 1, says this expert, who then emphasizes that high palatability in a food requires more than quality control . . . A straight talk to bakers that packs points for all processors

HAROLD M. FREUND

President of American Society of Bakery Engineers, Vice-President and Plant Manager, Freund Baking Co., St. Louis

WE CAN'T OVERLOOK the fact that we really don't sell products as such. Rather we sell the end - result — *palatability*.

So we bakers must ask ourselves: How shall we plan to make the public hungrier for our goods—of all types, new, fresher, and more interesting?

Maybe we should change the question, "Will it sell?" to "Will people want to eat it, and eat more of it?"

Actually, many of us have not paid close enough attention to the consumer's appetite, his palate, his love of new things to eat.

Too Much QC

Aren't some of us mistaking absolute quality control for appetite appeal? To be sure, quality control is necessary, but I sometimes wonder if we didn't standardize and synthesize a lot of old-time white bread palatability right out of today's loaf. And the same thing might be said of sweet goods and variety products in many areas.

Cites Ice Creams, Cereals

We are in a scramble to obtain an ever larger part of the consumer's dollar. And while many others have improved the appeal of their products, we have been far too reticent. We have been promotionally minded in many areas, but far too often we have promoted along traditional, and in some cases outmoded, lines.

Let's compare: Just a few years ago, there were 5 or 6 basic ice cream flavors and an occasional seasonal specialty. Now there are upwards of 35. And the very introduction of highly specialized flavors has often added impetus to the old favorites.

Again, there were only 7 or 8 cereals available to the housewife prior to World War II. Today she has her choice of over 20.

Americans as a whole are looking toward higher incomes, more leisure, more things to buy, use, and enjoy. But they are not likely to buy much more food per capita than they're buying now.

What does change is the kind—and quality—of food people eat. As incomes go up, they are likely to spend more on delicacies, choicer cuts of meat, and better grades of groceries. At the same time, they are likely to consume less potatoes, flour, and cereal products.

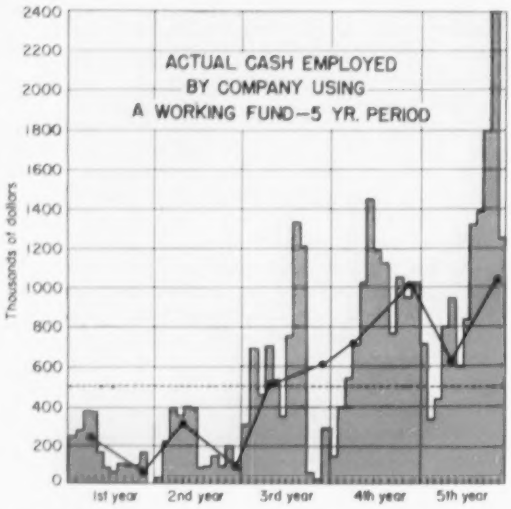
So it's possible that in future the public will eat fewer bakery items. And how shall we meet this challenge?

Need Entirely New Items

We must research and plan for more new products—completely new, rather than variations of items we have been selling for the past 30 years. We must attract customers by dint of new ideas, new packaging —and ever-improved *palatability*.

This research and development cannot wait. We bakers will be left 'way behind our competitors in the food industry if we do not start today to improve palatability. For in a thriving field such as ours, today must also be the day when tomorrow is taking shape.

The above article is based on the author's speech at the recent American Bakers Assn. annual convention in Chicago.



MONTH-BY-MONTH use of working funds over 5-yr. period is shown by this bar-graph. Ten black dots (linked by solid line) indicate average usage of money (checked twice yearly). Horizontal dotted line is scribed in to represent funds available if a $500,000 preferred-stock issue had been employed.

Working Fund Costs Less Than Preferred-Stock Issue

Five-Year Comparison Cites Actual Experience Figures of a Fund-Using Company Alongside Costs That Would Be Entailed in $500,000 Preferred-Stock Financing

Assumptions: If the company used in this example could have correctly forecast its requirements for 5 years in advance and had chosen a preferred-stock issue (the most desirable form of capital issue then available to it), the following assumptions would apply—

1. Preferred stock in the amount of $500,000 would have been issued—more than necessary in the first and second years but requiring supplementary bank borrowing for the third, fourth, and fifth years.
2. Cost of commission for sale of a $500,000 preferred issue would amount to $25,000, based on a 5% brokerage commission (not tax deductible).

Keeping the 'Calories' Coming

Your best bet is the long-range financial program. But you must shape it soundly if you aim for fullest, most economical utilization of your plant and equipment . . . Here's an expert's critique of several plans

SECOND OF TWO TIMELY FEATURES ON MANAGING YOUR MONEY

AS WITH ANY BUSINESS, operation of your food plant requires a broad use of working dollars—not only for machinery purchases, but also for such functions as raw-material and supply buying, payrolls, sales, and credit service to customers.

We've already explored the financial methods by which you can swing modernization projects—thus getting cost-saving competitive equipment in a manner that makes best possible use of your dollars.*

We now turn to the broader problem of setting up a *continuing* financial program. The target here is full and economical utilization of your plant over a period of years—with your capital (especially your working capital) constantly supplying a "high calorie" yield.

Stepped-up output, based on your new, modern establishment, increases your need for such working dollars. And when you find that your company's cash is inadequate to handle its current or potential volume, it becomes necessary for you to seek additional working funds.

—Which is quite a job today for any of us—and particularly for the many average-size food concerns that lack highly specialized financial managers.

One of your primary tasks as a manager is to anticipate requirements for procurement, maintenance, and effective use of your capital (funds invested in your company) and credit (funds borrowed by your company). You need to understand and deal with your financial structure in terms of the availability, true cost, and flexibility-in-use of your capital and credit.

Say you require funds for a temporary purpose. If your business has good credit, you likely can borrow. If, however, you have to have funds for a longer term, or in an amount out of proportion to the credit lines normal for your business, then money that serves a capital purpose is what you require.

The characteristics of such working funds (availability, true cost, and flexibility-in-use) are properly comparable with those of stock issues and long-term borrowings. Compari-

DAVID L. SALINGER

Director, Industrial Division, Walter E. Heller Co., national business-financing firm, with headquarters in Chicago

*See author's first article, "Get the Most 'Calories' From Your Working $$$" (FE Nov., p. 57).

3. For a $500,000 issue, attorneys', auditors', SEC registration fees, and certificates and stamp taxes would be $30,000 (not tax deductible).
4. With a preferred dividend rate of 6%, or 30% for the five years, dividend cost would be $150,000 (not tax deductible).
5. In the third, fourth, and fifth years, the company would have had to borrow from its bank, at an interest rate of 4½% (tax deductible) on a 90-day unsecured note, and with accurate forecasts of maximum needs to handle peak cash usage over the amount of the securities issue with 20% compensating balances. If the company couldn't borrow from the bank on unsecured basis for peak loads, an adverse effect would be felt on its profits, volume, growth, and prestige.

Note: The comparison above does not consider common stock warrants, additional cost of a preferred issue of this type, or call-premium costs incurred when preferred stock is retired.

Average Working Funds Employed, Based on Daily Use Averaged Monthly (See Graph)

1st year	$ 171,156
2nd	209,488
3rd	563,073
4th	881,767
5th	1,074,695

Working Fund Charges

	Cost
1st year	$ 19,783
2nd	23,224
3rd	73,765
4th	94,170
5th	117,876
Total cost, 5 yr.	$328,818
After-tax costs	$157,833

Preferred Stock, $500,000

	Cost
Commission @ 5%	$ 25,000
Attorneys' and auditors' fees and SEC Registration	30,000
Dividends @ 6%	150,000
	$205,000
Interest on bank borrowing (see below)	$ 48,060
After-tax costs	$253,060

Bank Borrowings Needed Each Year to Supplement $500,000 Preferred Issue

	Average Borrowing	Interest
1st year	None	None
2nd	None	None
3rd	$ 384,375	$ 17,297
4th	728,125	32,766
5th	1,112,500	50,062
		$100,125
After-tax costs		$48,060

Required Earnings Before Taxes (Assuming 52% Tax Bracket)

For Working Funds	For Preferred-Stock Issue
$328,818	$527,721

↑ Plan in Action ↑

From Your Working $$$

son with short-term bank borrowings disregards the fact that these financial tools perform completely dissimilar functions.

Let's now check some of the advantages and disadvantages of the customary ways in which your capital and credit can be augmented or supplemented—

Real estate mortgage funds are available to you from insurance companies, and other institutional lenders—if yours is one of those businesses having valuable real estate holdings. Here you must show a record of earnings indicating clear ability to meet payments. Long maturity and reasonable cost make such funds desirable.

Debenture issues, or other long-term unsecured borrowings, are also available, by either public or private institutional placement, when your business is well-capitalized and profitable. Rates are moderate and maturities medium to long.

Frequently, however, the cost to you of these funds is far greater than the regular interest rate would indicate. This is true not only because of the cost of placement, but also because of the inducements, in the way of stock options or other privileges, which may be demanded of you.

In many cases, furthermore, the funds which can be so obtained represent only a portion of your net worth, and therefore may be insufficient.

The indentures or loan agreements governing debenture issues customarily require that you maintain pre-set working capital ratios, and restrict your future both as to capital expenditures and to additional borrowings. These requirements may hinder your later development to such an extent that you may be compelled to prepay the debentures (if able), and at a premium, in order to remove the restrictions.

Short-term bank borrowings, which we already discussed briefly in connection with machinery purchases (FE Nov.), have a definite value for any enterprise with temporary financial requirements.

Bank credit is the best way to finance a seasonally expanded inventory, or additional receivables resulting from peak sales. Such borrow-

How does a Working Fund Plan perform? This is answered by the accompanying tables and graph, which compare the actual five-year costs to a manufacturer using such a plan with the alternative costs for a $500,000 preferred-stock issue.

Our graph shows the actual amount of working funds the company used. And the flexibility of such funds is illustrated by the monthly changes in funds used, from a low figure of $14,234 to a high of $2,395,245.

The five-year after-tax cost of $157,833 for the use of working funds is the true figure based on the monthly billings made to the company. As for the five-year after-tax cost of $253,060 for use of the $500,000 preferred-stock issue, this is based (as noted) on realistic assumptions.

Comparisons made are valid for the five-year period just past for the company in this example.

Naturally, requirements of different companies vary. You must analyze your own particular needs, the solutions available to you under the conditions of today's market, their relative costs, and what each alternative will accomplish.

Obviously, each of these factors must be considered before you can make an informed choice that will be of maximum value to your company.—*D. L. S.*

ment that you as borrower maintain substantial cash on deposit with the lending bank throughout the year, whether or not the total line of credit is being used.

Should a borrower misunderstand the short-term function of such bank credit, he will be requested before long to repay the loan, and properly so—one of the tests of eligibility for such credit being the ability of the borrower to stay out of debt to the bank for a certain portion of each year.

THE ROLE OF STOCK ISSUES

Preferred stock financing serves somewhat the same purpose as debenture financing. It has the additional advantage that its sinking-fund requirements are usually spread over a longer period of time. Thus the proceeds of a sale of preferred stock are available permanently.

Moreover, restrictions on company operations are less severe than with the typical debenture issue. And dividend payments are generally at a fixed rate.

A preferred stock, however, is difficult to place, unless the issuing company has an excellent record of earnings and is already in a strong financial condition. The cost of preferred stock financing, too, is greater than is generally understood: Dividend payment costs are substantial, and common stock options, or other privileges, must frequently be offered as an inducement to buyers. If the need for the preferred stock funds has passed, a premium must be paid for anticipating their redemption or retirement.

Common stock is sold, publicly or privately, to increase your permanent capital for expansion or other purposes. Many companies, of course, can find no market for their common stock. Even where a market does exist, many factors need to be taken into consideration before reaching a decision to increase permanent capital.

By offering common stock to others, owners of a closely-held business are in effect taking in additional partners. They must face the facts of dilution and possible loss of control, with earnings shared indefinitely into the future.

Underwriters who market corporate securities often ask for directorships. And of course they generally specify that a material discount be paid them for the public sale of common shares.

Dividends on preferred or common stock are *not* deductible from taxable income.

"Well, then," you may ask, "*Is* there one single method which avoids *all* the disadvantages cited above—one method which has *all* the advantages?"

Alas, there isn't! And we're sure you really didn't think there would be. But there is one remaining type of program much used and well established in a wide range of industries—that is, the specific Working Fund.

Such a fund doesn't involve restrictions, as do debenture financing and preferred stock, nor does it demand a sharing of earnings or a division of management control, as with common stock.

Moreover, there are no penalties for a pay-off, and the cost in some cases can be substantially less than (for example) a stock issue.

Working funds are generally provided only after careful analysis of the needs of the company—which must show that the funds sought will serve a constructive purpose. All this, however, can be accomplished in a matter of days.

The funds so supplied *revolve*—that is, they are drawn upon and repaid at intervals, as the borrower's requirements fluctuate up and down. Accounts receivable, notes receivable, all or portions of inventories, and machinery and equipment are generally acceptable as collateral.

When your needs are high, additional funds are thus available to carry increased receivables and inventories. When your needs are less, usage of funds is reduced correspondingly, with no prepayment premium. Then with activity again increasing, the higher usage can be reinstated.

This cycle can be repeated as many times as necessary. In effect, then, you are thus enabled, to draw funds as you need them.

Let's assume your payrolls are on the 1st and 15th of each month, and your suppliers' invoices are discountable on the 10th. Accordingly, working funds may be obtained on precisely those dates. They need not lie idle in your bank account. The great flexibility of this procedure materially reduces financing cost.

Our accompanying example (see panel) clearly shows the actual five-year experience of one company in cash employment and costs under a Working Fund Plan.

Such working funds are also supplied through the outright purchase of accounts receivable. This, as you likely know, is called "factoring."

In a factoring program, the factor's client has the advantages of the factor's expert credit and collection facilities, is relieved of bookkeeping detail, and has no responsibility for bad debt losses.

Increased awareness of the advantages of factoring is evident in the steady growth of its usage.

For manufacturers, distributors, or dealers who handle capital goods, or other income-producing equipment, on time-payment sale or on lease terms, some of the larger and more diversified industrial financing companies also provide working funds by purchasing such installment obligations of the client's customers. In fact, this is quite common in the food industry.

Thus the working fund can be made available under a number of different programs, each designed to meet individual requirements. Under most of these programs, the user need not prepare for fixed maturity dates: He simply continues as long as he has need and can show profitable use of its funds and services.

A LOOK AT COSTS

All these methods have one thing in common: They cost money. However, you may take a leaf from the successful operation of many companies today (including business financing companies). Here, the costs (including those for the money) are thought of in terms of "What is the additional profit?"

These companies "trade on the equity". They borrow as much as they can profitably and safely use, and figure profit not against volume but against their investment—net-after-tax vs. capital-and-surplus.

If you can make an additional $25,000 by turning over an extra $100,000 in your business say five times a year, or $500,000 volume, that is "only" 5% on volume.

But if you are worth, say, $100,000, that $25,000 is 25% of your equity. And that $100,000 extra money can cost you $6,000, or $12,000, or even substantially more.

But on the basis of $25,000 added profit you are still 'way ahead by borrowing it.

To put it in the kind of phrase you may constantly employ with your own customers—none of us need be fooled by the price tag on machinery, or money, or men.

In short, the cost is not important *if* the net result warrants it—and *if* you get the right high-calorie yield from your dollars. *End*

Food Irradiation Makes Strides

More than 100 items cleared for QM testing. And human volunteers have lived for months on full diets of rayed foods. But plant-process hurdles remain . . . Status of various tested foods detailed. Ray sources described

VERY NOTEWORTHY expansion and progress have marked the last two years of QMC's project on radiation preservation of foods.

In fact, we may point to accomplishments in all seven of these major spheres of interest—

1. Radiation sources, 2. their measurement, 3. effects of irradiation on foods, 4. acceptability of irradiated foods, 5. wholesomeness of such foods, 6. packing and packaging of them, and 7. future production plans.

Let us go right to the highlights:

Effects on the Foods

Hope that the use of ionizing radiations will be successful in providing better foods for the Armed Forces, while reducing present refrigeration requirements, is now advancing toward probability.

More than 100 irradiated food items have already been cleared for human testing by the Office of The Surgeon General, U. S. Army, following animal-feeding tests. The majority of these have now been subjected to taste evaluation.

These potential ration components have been studied to determine the effect of radiation doses up to about 3 million rads on their acceptability.

Some of the most promising are bacon, green beans, and peaches, which have withstood one year of 72F. storage.

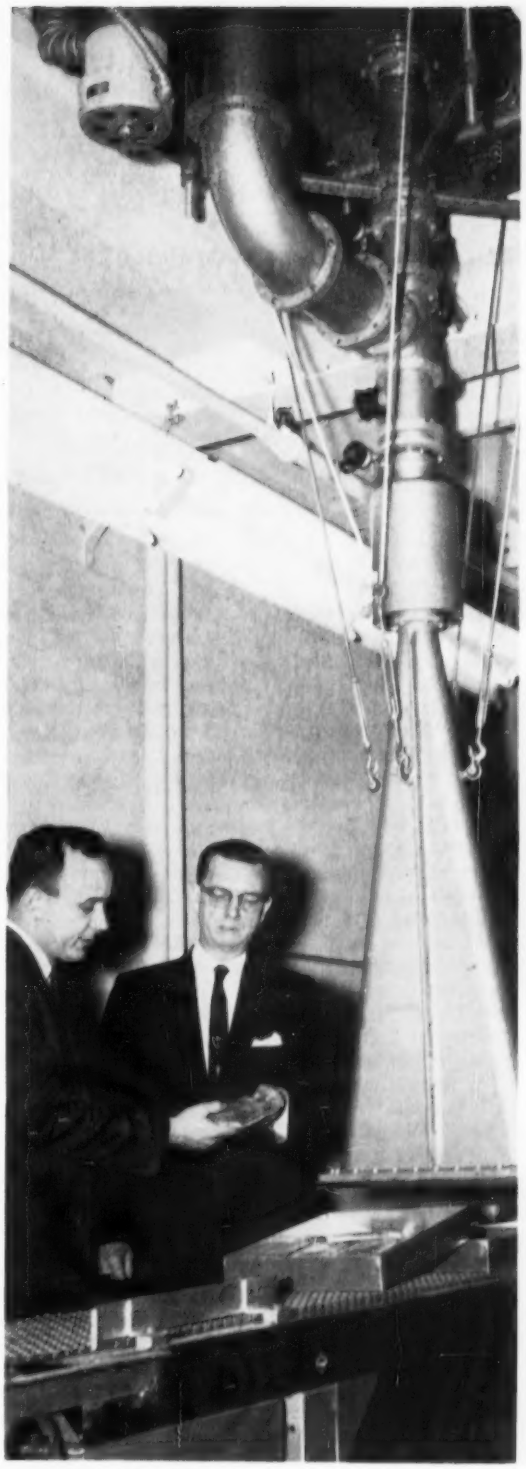
Among the many others under study are pork, chicken, lamb, beef liver, oysters, shrimp, halibut, codfish cakes, white and sweet potatoes, carrots, cabbage slaw, lemons, oranges, and pears.

As for formulated dishes showing promise, these include chicken and vegetables, frankfurters and beans, and beef stew. Meanwhile, insect deinfestation is being investigated in dried fruit, flour, and cereal bars.

After doses of nearly 2 million rads, bacon, beef roast, veal roast, pork roast, beef steak, pork chops, and lamb chops were all deemed acceptable by panels of more than 100 observers. However, some of these treated foods possessed flavors and odors distinct from those of "normal" or customary products. (*Turn page*)

LT. COL. GEORGE E. DANALD

Nuclear Effects Engineer, Quartermaster Food & Container Institute for the Armed Forces, Chicago.



A TEST BATCH of hamburgers gets "pasteurizing" bombardment of electrons from Van de Graaf unit. This is 2 million electron volt instrument at High Voltage Engineering Corp., Burlington, Mass., which is working on QM studies. Company's Roy Emanuelson (left) shows sample of rayed meat to FE Editor Frank Lawler.

PROGRESS HIGHLIGHTS of QMC Food-Irradiation Project

	2 Yr. Ago	Today
Amount of food annually irradiated for studies..	A few tons	Some 200 tons
Status of techniques	Knowledge that some foods could be preserved by irradiation	Full meals consisting entirely of irradiated foods prepared by Project
Pilot-plant plans	Just in discussion stage	$7 million facility about to be constructed
Contracting institutions cooperating in Project studies	50	100
Annual Project budget	Under $1 million	$2 million plus

Recent evaluations show that the 300,000 to 500,000-rad dose is the maximum fresh vegetables can stand without serious impairment of acceptance.

But the basic problems involved in adapting the radiation preservation process to ration production need further study, even for the most promising foods.

Irradiation of foods often results in undesirable sensory changes, which vary considerably from product to product.

While pork and poultry are generally good, beef is less desirable. A reddish discoloration appears in meat and poultry products. Some fish and fruit products turn brownish, and the characteristic green color of fresh cabbage and lettuce disappears.

Means for overcoming these changes is dependent upon determination of their causes. This presents an extremely complex problem, since these changes can result from only infinitesimal changes in the chemical constituents of the food products.

Vapor-phase chromatography with mass spectrometry and infrared spectrophotometry are techniques being used to identify and measure these minute changes. Some of the radiation produced compounds that have been identified are carbonyls, sulfides and amines, organic acids, and saturated and unsaturated hydrocarbons. They are known to be of importance to flavor, but specific evaluation of each remains to be performed.

Extensive microbiological studies are in progress to establish—and to reduce—the dosage necessary to kill bacteria with minimum adverse sensory effect on foods. Also, combination processing is under investigation.

Preliminary evidence indicates that doses required to sterilize meat can be reduced by precooking or by early application of antibiotics.

Further radio-pasteurization studies on fresh fruits and vegetables have resulted in a twofold, or greater, extension of shelf-life by doses sufficient to inactivate the major part of the mold population without causing such extensive physiological damage as to result in noticeable softening or color change.

These radio-pasteurization doses have been successfully applied to fresh strawberries, lemons, oranges, and peaches at doses which would not normally produce significant changes in acceptance.

Enzymes are not inactivated to any appreciable degree by the radiation doses employed in food preservation. Accordingly, efforts have been made to combine just enough heat treatment to inactivate food enzymes with just the amount of irradiation needed to kill the bacteria.

In the case of raw meats, this has been found to prevent the occurrence of bitterness and undue texture breakdown in subsequent unrefrigerated storage.

Establishing Wholesomeness

The wholesomeness and nutritional adequacy of irradiated foods must be thoroughly established before such items can be adopted by the military.

Already, human volunteers have consumed a 100% diet of irradiated food for twelve weeks without any adverse physiological effect.

Carried out at Fitzsimons Army Hospital, Denver, this test was under the direction of the Office of The Army Surgeon General.

Moreover, two year, two-species animal-feeding studies have been instituted on 21 different food items to establish the complete safety of prolonged consumption of irradiated foods. The tests are aimed at clearance, by both the Surgeon General of the Army and FDA, of irradiated foods for human consumption.

The run on the first of the foods to be placed in this long study will be completed next June, according to the present schedule. Feeding of the last of the foods was started a few days ago. And beef, pork, flour, and potatoes are well under way.

Others which have been started are codfish, peaches, boneless chicken, sweet potatoes, green beans, bacon, evaporated milk, and fruit compote.

Investigations to uncover any possible specific effects of irradiated diets on reproduction in animals, or of irradiation on alteration of biological value of the foods, have begun and are continuing.

Key Packaging Aspects

The irradiated foods must be suitably packed both to withstand the radiation without adversely affecting the packages or food and to prevent recontamination of the food subsequent to irradiation—i.e., during handling, transportation, and storage.

With this in mind, investigations have been conducted with both rigid (tin-plate cans) and non-rigid (plastic and plastic-aluminum foil combination) containers.

The tin-plate metal can has proved to be the most satisfactory container to date.

Here, a partial solution has been found for two of the troublesome features—the compound and the enamel. Most compounds, except those made of butyl rubber or other elastomers that undergo chain scission, are satisfactory. As for the enamels, the oleoresinous ones are usable with non-fatty foods, and the phenolic types are usable with fatty foods.

More work is required on can enamels. However, we can now obtain a can having reasonable serviceability for irradiated foods.

Most existing non-rigid containers would be satisfactory for foods treated with doses below 1 megarad. Doses above 1 megarad pose problems with these containers: Odors are generated in the package, and there

is some deterioration of the package by active food ingredients.

Further, there are indications that some microorganisms can penetrate the wall and seals of flexible containers, particularly after the container has been folded or creased.

It is noted that odors generated in the package do not affect all foods equally. Moreover, foods which are not sensitive can be irradiated in plastic packages.

Measurement of Doses

The question of how to measure radiation doses at intensities required has been under considerable study, and rapid strides are now anticipated.*

Major radiation sources employed by our project are being compared by use of three umpire systems—namely, cobalt glass, ceric sulfate, and photographic (print out) emulsions.

Results show remarkably good agreement between sources, even though each was calibrated differently. True, one or two anomalies showed up, as expected. But these are being further investigated.

Dosimetric systems now in use are: Ferrous sulfate (for all practical purposes the temporary standard), ferrous and ferrous-cupric sulfate, calorimeters, ionization chambers, several glasses, and photo emulsions. Also, a variety of miscellaneous materials have been used, such as dyed cellophane, chlorinated hydrocarbon-water systems, and colored pressure-sensitive adhesive tapes. Even pink marshmallow cookies have been tried, although not too seriously.

10 Radiation Sources

QM's project is utilizing ten major sources of radiation, including (1) electron beams, (2) X-rays, and (3) gamma rays.

Electron beam sources are available at three industrial plants: General Electric, Milwaukee (2 mev. resonant transformer); High Voltage Engineering Co., Burlington, Mass. (2 mev. Van de Graaf unit); and Applied Radiation Corp., Walnut Creek, Calif. (8 mev. linear accelerator).

In addition, there are linear accelerators working on single projects at Chicago's Argonne Cancer Research Hospital and Michael Reese Hospital. The former's 50 mev. instrument is being used to study radioactivity induced in foods by high energy electron beams. The latter's 30 mev. unit is being applied in microbiological studies.

Currently, however, the major portion of food irradiations is with gamma rays, with heaviest use at the Materials Testing Reactor, near Idaho Falls.

Employed here are three grids of fuel elements with water-filled tubes accommodating No. 2 cans, and two grids with tubes accommodating No. 10 cans.

In one peak month at this facility, 90,000 pound-megarads of food was irradiated.

The grids of fuel elements are at the bottom of a water-filled canal, and the cans to be irradiated are inserted in fresh water-filled tubes that run from above the canal surface to deep within the fuel-element grids.

* We may note that a National Research Council subcommittee has met several times with QM. Further, the National Bureau of Standards hopes to begin dosimetry research soon. There is also coordination on this question with the Aircraft Nuclear Propulsion group and American Society for Testing Materials. Moreover, a project at Stanford Research Institute is concerned with choosing and developing dosimetric systems for experimental food irradiation and pilot plant requirements.

See Pilot Plant Running in '58

There has been a growing need for a production-type facility. And so the new U. S. Army Ionizing Radiation Center has been designed and is now at the construction stage.

First elements of this new plant should come into operation in late 1958.

To be located on the site of the Sharpe General Depot, near Stockton, Calif., the Center will have this three-fold objective:

(1) To produce a great deal more irradiated food for research and testing; (2) to prove out, technologically, the various processing parameters and variables; and (3) to obtain measurable cost data that can be extrapolated to industrial-type facilities.

The design calls for four major elements: Office and laboratory spaces, a processing plant for all foods, a gamma radiation source from a nuclear reactor,* and an electron beam radiation source using a linear electron accelerator. Some of the equipment is already being procured.—The Author

* AEC has now halted the contract on this specific unit, leaving the gamma-ray equipment undecided (see news story, p. 139)—Editor

Second most used gamma facility is at the Army Chemical Corps' Dugway Proving Ground, in Utah. Its elements are surrounded by a steel-and-lead cask with a central tube through which the cans pass. The whole assembly is in air in a "hot" concrete cell having 5-ft.-thick windows filled with zinc bromide solution.

Not only does this enable irradiation of cans in an air medium, but it also permits control of air temperature within the 20-200F. range.

Here, the cans also rotate as they pass through the field. The elements are in a horizontal plane, and cans do not remain static in the longitudinal direction within the field.

Instead, they rotate about their own long axes longitudinally through the field. Thus, uniformity of dose distribution is maximized throughout the can of food. This is the only facility of its kind available to QMC.

Third most used gamma source is at Argonne National Laboratory, Lemont, Ill. At this facility, the cans are placed in sealed aluminum tubes for lowering into the grid of fuel elements. Then, the tubes are rotated during their stay in the gamma field.

Cobalt-60 sources are at Stanford Research Institute, Menlo Park, Calif., and at Battelle Memorial Institute, Columbus, Ohio. These are fairly conventional sources placed on the bottom of water-filled pools.

However, at Dugway a 4,000-curie cobalt source is uniquely arranged in a lead cask in air in such way that the dose *rate* can be varied from less than 3,000 to better than 300,000 rads per hour.

Air surrounding the samples can be controlled at 0-180F. temperatures, and the sample rotate within the field. However, they do not move longitudinally within it, but remain in place during the irradiation.

X-ray use is through employment of Battelle's soft X-ray machine. Thus far, this source has had only minor project use, but it is expected to be more extensively employed.

Article based on paper presented at General Electric Co.'s symposium in Milwaukee.

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Fig. 270-UN, Nickel Alloy Wedge	Fig. 280-UN, Nickel Alloy Wedge
Fig. 270-UL, Bronze Wedge, U.L. approved for L.P.G. Services	350 psi Fig. 280-UX, Bronze Wedge

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Ole Sage Episode

How Can You *Communicate* With Workers?

IVAN C. MILLER
"Food Engineering"

"TODAY we tear into that matter of communicating with the personnel," rasped Batt Bulwark, works manager of Mull & Mull Co., as the Guff & Gripers rounded off their luncheon desserts.

He went on: "I'm still fighting that problem of low worker morale at our place. But it's too darned easy to just say 'Communications failed.' That's everyone's No. 1 alibi."

"Meaning it's yours, too, Batt?" slyly queried Milt Sorenson.

"Not by a long shot," growled Batt. "As I've said before, *I* came up the hard way. Back when I started, the only 'communications' we had was 'Get out the production!' And when the boss said that, he meant 'Do it—or else!' If workers didn't, he hired a new crew that did."

"Don't tell us you use those tactics today at M&M," needled Milt.

"You know we can't," grumbled Batt, "on account of the union!"

"So the union is your No. 1 alibi?" Milt continued his badgering.

"Well," said Batt, "when I say the unions have made things different, it's not an alibi. It's a fact."

At this point Ole Sage intervened. "Batt's right—to a degree. Unions *have* made things different.

"It was the employees' need to talk with management that gave impetus to unionism. Employee insistence on talking with management, and also being listened to, has made it important for management to develop and improve its communications."

"I'm glad for once I'm right—even if only to a degree," grinned Batt. "But now, Ole, tell us just what you mean by 'communications.'"

"In a broad sense," explained Ole, "communications cover every transfer of information between management and employees—and further any transfer of information *at any point* from top to bottom or bottom to top.

"Most managements employ a number of methods," Ole continued. "Among the oral means are executive messages and instructions to groups, also specific explanations or comments from a boss to an individual or a group—in person, by phone, or over a loud speaker.

"There's another oral communication," he added, "that's a thorn in the side of some managements—that's the 'grapevine.'"

"**How true!**" exclaimed Barney Hasbrook. "Yes, the grapevine sure causes a lot of trouble in some plants."

"You say 'in some plants,'" snapped Batt. "I'd say in all. There's always a grapevine."

"It's the *disorganizing* type of grapevine that I mean," came back Barney. "That kind quickly fills the vacuum that results when management fails in its communications—or hasn't tried to communicate in the first place."

"Barney's so right," Ole resumed. "A harmful grapevine flourishes on rumors and misinformation and is an indictment of management's methods. On the other hand, when the communications are sound, either the grapevine withers or else turns into a management asset transmitting goodwill.

"We've mentioned oral communications. They are the unavoidable means of transmitting instructions every day. Of course," he added, "there is also a growing variety of written communications—the bulletin board, foreman and employee

"It's the disorganizing type of 'grapevine' that I mean," came back Barney. "That kind quickly fills the vacuum that results when management fails in its communications."

"Management attitude . . . is the form of communication too often overlooked"

manuals, memos, letters, posters, pay-envelope enclosures, reading racks, employee publications, and the company's annual report—to name major ones."

"That seems like much more than too much," grunted Batt, "and what's more it sounds to me like a lot of money. So I'd like to know which ones are the best, what do they cost, and are they worth it."

"Before attempting to answer any of Batt's questions," suggested Ole, "let's consider one other means of communications, which in some organizations is a profitable asset to management and in others a morale-disrupting influence."

"Isn't that something!" belittled Batt. "Ole's got one that can be 'very, very good, but when it's bad it's horrid.'"

"That goes for any communications," grinned Ole, "It's what employees *understand* by what management says that counts—more than whether it's written, or oral, or what medium is used.

"What I'm referring to here is that form of communication that's too rarely recognized—too often overlooked—*management attitude*."

"There you go again with your generalities, Ole," interrupted Batt. "Just what do you mean? Let's have a couple of brass tacks."

"I'll gladly give you an example," Ole conceded. "Years ago I was acquainted with the family owners of a food plant of fair size that brought to this family only a meager return each year on the capital invested. None of these owner-executives ever appeared at the plant—and seldom enough at the office.

"The real management of the plant was 'hired help,' just like the rest of the employees. The attitude of most of the latter toward their jobs was 'we just work here—but not any more than we have to.'

"Then the president-owner's son went to work in the plant, and in time succeeded his father as head man. From the son's very first day he was interested in every detail of the plant and in the employees, too. And everyone knew he was.

"For many years now the employees have had a union, but the employees swear by and are loyal to their company.

"Today's production volume and output per man-hour are many times what they were 15-20 years ago—and so are the profits.

"I say again, then," continued Ole, "that the way management acts and the things management does, as well as everything management says—and how it says it—are very critical areas of communications."

"And," chimed in Milt, "that goes for all management."

"Now, can't we get back to my questions?" pleaded Batt. "What in general is the cost of communications? Are results worth the cost? What's the comparative value of each type? And which ones are best?"

"You've been in more plants than the rest of us, Ole," Barney pointed out, "so why don't you give Batt the 'brass tacks' he wants?"

"If it's agreeable," suggested Ole, "Let's start with bulletin boards, since they're the common medium for visual communications."

"Why is that?" Batt cut in. "Because bulletin boards are cheapest?"

"Boards are low in cost," said Ole. "But the reason every plant has a board is because each is required to post permanently certain legal notices—relative to workman's compensation, the minimum wage law, and certain local ordinances."

"How valuable for communications do you consider the boards?" asked Milt.

"Too frequently," lamented Ole, "their worth is far below their potential. Boards can be the backbone vehicle for getting across management messages and ideas accurately, authoritatively, and convincingly. But all too often they're completely ignored by employees because everything on the board is dusty and ragged with age."

"What is it that makes them pay off?" Batt insisted.

"Boards," replied Ole, "can be eye catching with color and arrangement and lively with items of interest—at very little cash cost. The real price is the persistent and sincere interest at the top plus the effort, enthusiasm, and creative ability of whoever is responsible for board operation.

"And who's usually picked for that?" questioned Milt.

"In most plants, whoever's in charge of personnel relations," said Ole.

"That sounds like they're only for big business," Batt belittled.

"To the contrary," countered Ole, "boards offer a great opportunity to the small operator—so therefore they can be very effective in the many food plants where the cost of an employee news sheet would be prohibitive."

"What're you saying?" cut in Batt. "That bulletin boards are just as good?"

"For the small business," said Ole, "the bulletin board can be made as effective as is a creditably edited house paper for the big operator.

"What do you put on them to make them so good?" pressed Batt.

"The things employees want to read—on any of 40 or 50 subjects. Usually, information about the company and about their jobs: Safety cautions, suggestion awards, vacation and holiday schedules, news about company products and developments, employee activities, and so on. With creative use of color and layout, a grand job can be done."

As Barney pushed back his chair to signal the end of the meeting, Ole added: "Just remember that your results will be no better than the enthusiasm and drive with which real interest and aid is spurred by top management.

"Finally, if you want more 'how-to' information on bulletin boards, see the booklets put out by NICB and the U.S. Chamber of Commerce, also *Better Business Communications*, published by McGraw-Hill Book Co."

UP THE HARD WAY came Ole, our principal character in this special series of "cases" fictionized to pinpoint boss-worker problems in the food plant.

Ole began as a laborer, proved himself "a good worker" who "used his head"—thus won the respect of both workers and bosses. He later rose to foreman, then superintendent. And finally he was management's choice as "a natural" to head Industrial Relations, a job he carried out with unusual success until his retirement.

—Actually, his was a short retirement: His old company, others, too, quickly called on him for counsel, and his know-how was always "on tap" for the working Guff & Gripers—as related in these espisodes.—*The Editor.*

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MARKETING

What can you expect in

TOMORROW'S FOOD MARKET?

Food sales bid fair to be 50% greater in 1958. But tomorrow's consumer may be a different breed. Changing him are salient factors that your long-range planning must carefully consider: The uptrend in family income, population shifts, increased leisure time, and the influence of more education.

ONE OF THE BASIC yardsticks for measuring market potentials of food products is population—people with appetites.

And a companion yardstick is distribution among the people of income—indicating what they'll spend to satisfy those appetites.

Combine these two sets of facts and you have a launching site for projecting the future market.

Today's population data are easily obtained. However, tomorrow's are something else. In short, where your long-range planning is concerned, the data are more elusive.

All signs point to a population boom in the next 10-15 yr. But the spectacular population shifts of the past few years underscore the puzzle of which marketing areas will grow, which ones will shrink.

Population data alone, however, aren't the whole story. Accurate long-range planning correlates the expected population changes with the economic trends that will make your customers of tomorrow different from today's.

Some of these trends—which we'll presently discuss at length—are upgrading of families in the income scale, increased purchasing power, higher education levels, more leisure time, new family formations, and greater emphasis on suburban living. **All of these trends will definitely affect sales of your products.**

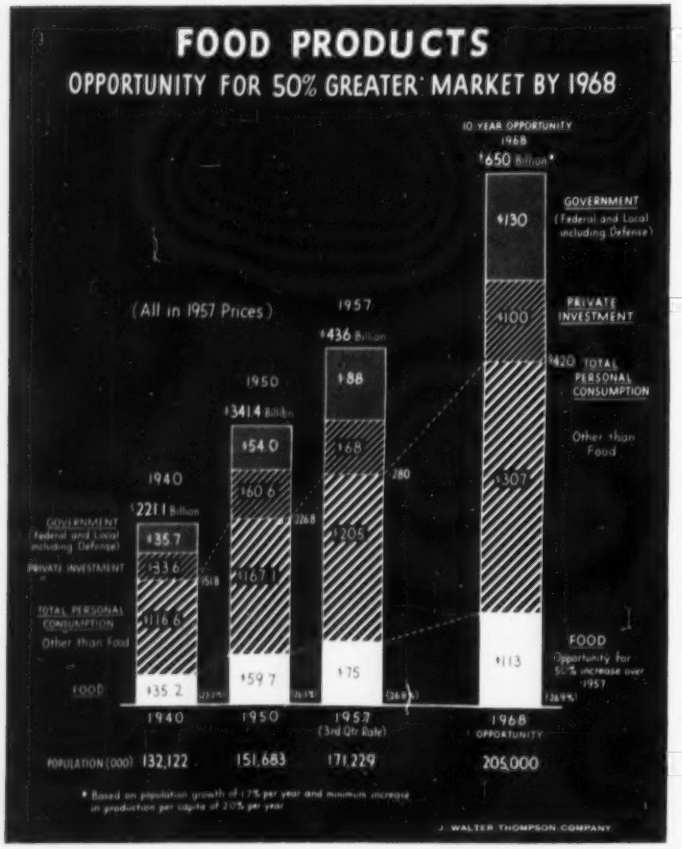
But how can you determine the specific influences on your sales? Well, a groundwork for gaging "people with appetites" has already been laid out in the Census Bureau's *Illustrative Projections of the Population by States*—1960, 1965 and 1970.

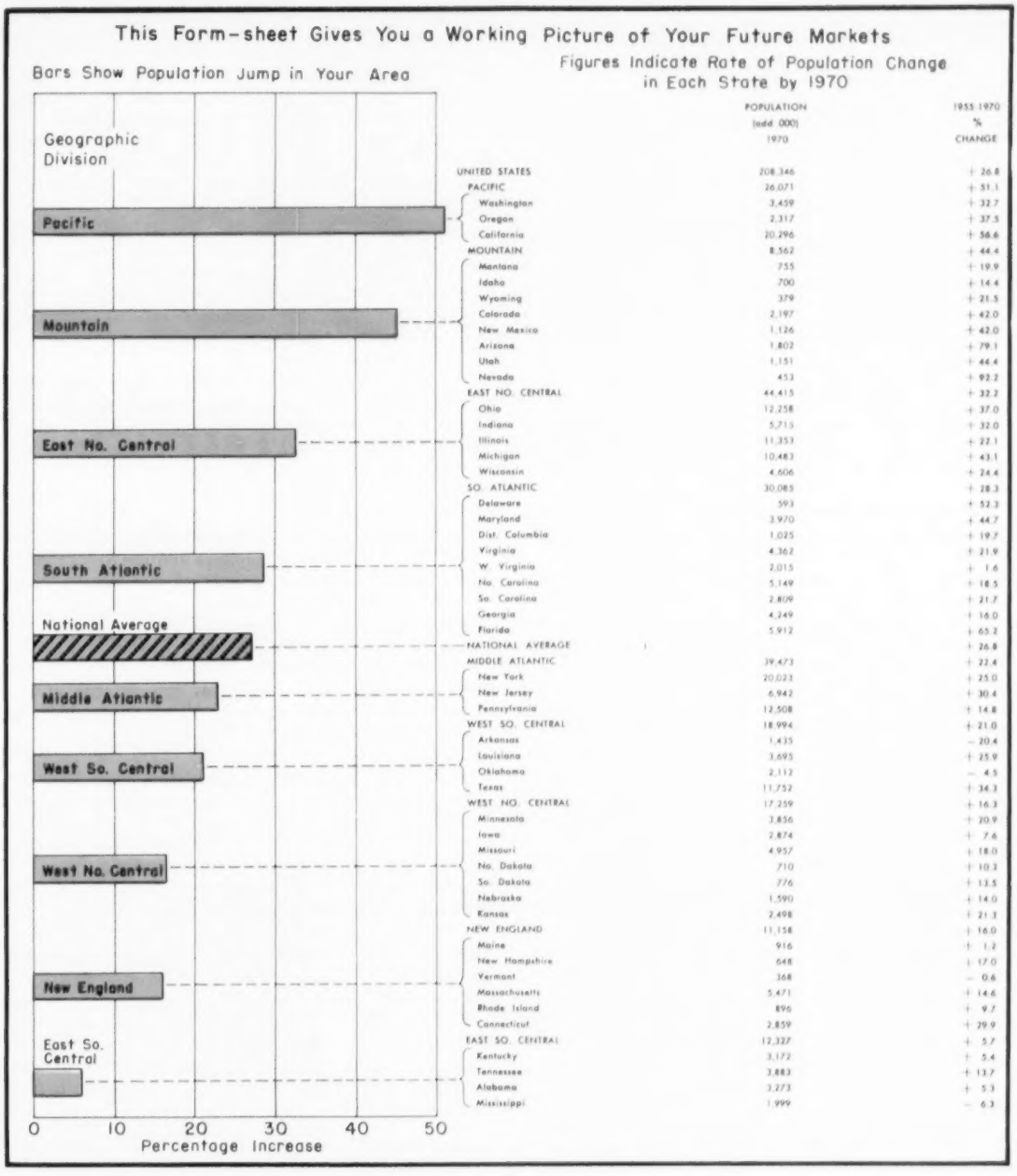
Here, it's first pertinent to know the range of this population survey. The report presents four series of projections of the population of each region, geographic division, and state for 1960 to 1970. It takes into account the estimated changes in state populations that have taken place since 1950, as well as previously assumed changes in national population for the projected period.

Projections are shown for several broad age groups: Under 18 yr., 18 to 64 yr., 65 yr. and over, and 14 yr. and over. The figures represent civilian population and armed forces.

Although the figures are subject to relatively large errors, they serve as rough guides for many planning purposes.

The rates of population change




This Form-sheet Gives You a Working Picture of Your Future Markets
Bars Show Population Jump in Your Area
Figures Indicate Rate of Population Change in Each State by 1970
Geographic Division
Pacific
Mountain
East No. Central
South Atlantic
National Average
Middle Atlantic
West So. Central
West No. Central
New England
East So. Central
0
10
20
30
40
50
Percentage Increase
POPULATION (add 000) 1970
1955-1970 % CHANGE
UNITED STATES 208,346 + 26.8
PACIFIC 26,071 + 51.1
Washington 3,459 + 32.7
Oregon 2,317 + 37.5
California 20,296 + 56.6
MOUNTAIN 8,562 + 44.4
Montana 755 + 19.9
Idaho 700 + 14.4
Wyoming 379 + 21.5
Colorado 2,197 + 42.0
New Mexico 1,126 + 42.0
Arizona 1,802 + 79.1
Utah 1,151 + 44.4
Nevada 453 + 92.2
EAST NO. CENTRAL 44,415 + 32.2
Ohio 12,258 + 37.0
Indiana 5,715 + 32.0
Illinois 11,353 + 27.1
Michigan 10,483 + 43.1
Wisconsin 4,606 + 24.4
SO. ATLANTIC 30,085 + 28.3
Delaware 593 + 52.3
Maryland 3,970 + 44.7
Dist. Columbia 1,025 + 19.7
Virginia 4,362 + 21.9
W. Virginia 2,015 + 1.6
No. Carolina 5,149 + 18.5
So. Carolina 2,809 + 21.7
Georgia 4,249 + 16.0
Florida 5,912 + 65.2
NATIONAL AVERAGE + 26.8
MIDDLE ATLANTIC 39,473 + 22.4
New York 20,023 + 25.0
New Jersey 6,942 + 30.4
Pennsylvania 12,508 + 14.8
WEST SO. CENTRAL 18,994 + 21.0
Arkansas 1,435 − 20.4
Louisiana 3,695 + 25.9
Oklahoma 2,112 − 4.5
Texas 11,752 + 34.3
WEST NO. CENTRAL 17,259 + 16.3
Minnesota 3,856 + 20.9
Iowa 2,874 + 7.6
Missouri 4,957 + 18.0
No. Dakota 710 + 10.3
So. Dakota 776 + 13.5
Nebraska 1,590 + 14.0
Kansas 2,498 + 21.3
NEW ENGLAND 11,158 + 16.0
Maine 916 + 1.2
New Hampshire 648 + 17.0
Vermont 368 − 0.6
Massachusetts 5,471 + 14.6
Rhode Island 896 + 9.7
Connecticut 2,859 + 29.9
EAST SO. CENTRAL 12,327 + 5.7
Kentucky 3,172 + 5.4
Tennessee 3,883 + 13.7
Alabama 3,273 + 5.3
Mississippi 1,999 − 6.3

implied vary substantially from one geographical region to another. Projections for the West (Mountain and Pacific) indicate considerably higher rates of growth than for most other divisions.

Population growth of the Pacific States is projected at almost twice the national average (51% vs. 27%). In the East South Central States it may grow at only one-fifth the national average.

The "component" method used involves the preparation of separate projection of each of the components of population change—i.e., births, deaths, and net migration. More specifically, the procedure consisted of carrying forward, by 5-yr. time periods, population estimates of each state by age for 1955, on the basis of certain assumptions concerning each of the components of population change for future years.

Because it is not possible to predict future population changes with confidence, several different series of projections were derived, employing alternative assumptions regarding these figure changes. In general, the assumptions were based on past trends in the components and on the state-national differences in the components.

The particular assumptions used for the components of population change are:

Migration. A combination of the 1950-55 and the 1940-55 levels is assumed. For the first part of the projection period (1955-60) 1950-55 levels are assumed to prevail. Then, those levels are assumed to change linearly so as to equal the 1940-55 levels by 1970-75.

Births. Rates of 1954-55 prevail for the 1955-60 period, then decline linearly to the 1950-53 levels by

1970-75. State rates were based on national rates.

Mortality. Projections were tied in with unpublished U.S. mortality rates furnished by the Social Security Administration.

National population projections. The state projections were adjusted to add to national totals at various stages of the computations.

For this purpose, the latest available national figures (Census Bureau's *Current Population Reports*, Series P-25, No. 123) were used for three of the four series of state projections. For the other series new national projections were developed.

The Future is No Fat Cat

It would be fallacious to base long-range marketing plans solely upon "people." True, the basic factor is population. But the accelerated competition for the consumer's dollar in the next decade will increase the influence of long-range trends.

The correlation between population and trends in consumer food-buying habits is emphasized by Arno H. Johnson, vice-president and senior economist, J. Walter Thompson Co., N. Y. He estimates that food manufacturers in the next decade must increase their sales 50% (from $75 billion to $113 billion) if they're to keep pace with the uptrend in productive capacity and living standards.

This 50% gain is a minimum goal, Mr. Johnson stresses, because it assumes that consumers in 1968 will allocate the same 26.8% of their personal consumption expenditures for food as they did in 1957. Thus, with expenditures reaching $420 billion by 1968, food purchases should total $113 billion.

Population increase will not be enough to push food purchases up to this higher level. With population expected to reach 205 million in 1968 (as against 174 million in 1958), this represents only an 18% gain for the food market.

The remaining two-thirds of the 50% potential increase must come from changes in food habits. Those necessary changes represent the marketing challenge the food industry faces in the next 10 yr.

Among the factors that will shape those changes are improved packing, upgraded diets, better product quality, increased convenience, wider selection of foods, and more effective marketing programs.

Mr. Johnson spotlights nine significant trends that emphasize the great challenge selling and advertising will face in the next decade. All nine—detailed below—are making for rapid changes in our living standards. And all demand similar rapid changes in our marketing concepts.

1. Increased purchasing power. Discretionary spending power, now 6½ times as great as in 1940, should grow another 70% by 1968 if consumer prices hold reasonably near present levels.

Families are moving up the income ladder. By 1960, family units with disposable income over $4,000 may total 36 million, three times the 12 million of 1950.

The purchasing power will be there, but advertising will have to siphon it into the food stores.

2. Higher education level. With 98% more high school graduates in our population this year than in 1940, people are more sophisticated in their shopping.

These shoppers should be quicker to recognize improvement in products, packaging, and convenience.

3. More women workers. Working women in the 20-64 age group increased 46% between 1942 and 1956, while their male counterparts increased 19%. This was in spite of the rise in marriages, new accent on family life, and 41% climb in child bearers.

With both homes and jobs to manage, these women will be influenced by packaged convenience food products.

4. More leisure time. Workers' vacation time has doubled in 10 yr.—from 34.4 million weeks in 1946 to 70 million weeks in 1956. Furthermore, 85% of vacations in 1956 were with pay.

Appliances and convenience products have cut down drudgery, increased leisure time.

5. New family attitudes. Along with the greater percentage entering the married category, home ownership has uptrended, families have grown bigger and moved to the suburbs, religion has undergone a revival.

Births rose 65% between 1940 and 1957, up from 2.6 million to 4.3 million. This has changed the population's age makeup—with 76% more children under 5 than in 1940, and 68% more in the 5-9 age group.

6. New family formations. As a result of the postwar baby boom, teen-agers are swelling in numbers.

By 1970 the number of persons in the 18-21 age group will grow to 5½ million, or 77% more than in 1952. Starting around 1960, there will be a rapid increase in the number of persons reaching the 18-yr.-old level, indicating a record growth over the following 15 yr. in new family formations and births.

As the new families are formed, food marketers will have a glowing opportunity to establish brand loyalty and purchasing habits.

7. Population mobility. Around 159 million people, equivalent to the entire civilian population, changed their residences between 1951 and 1956.

Such mobility is particularly high among young adults. Figures show that in a single year 43% of young married women in the 18-24 age group will change residence, and 28% of those in the 25-34 group. With such a rapidly shifting population, top performance in distribution of product and identity of package is necessary if you aim to retain brand loyalty.

8. More suburban living and self-service. Between 1950 and 1957, suburban population has grown seven times as fast as that of the rest of the United States—a 36% increase vs. 5%.

Furthermore, 85% of the net growth in population since 1950 has been in the metropolitan markets and their suburbs. This has spurred the rapid expansion of shopping centers and of supermarkets.

With self-service and the vast rise in number of items offered on the shelves (over 5,000 in a typical supermarket), the pre-selling influence of advertising has become more important.

9. Growth of advertising influence. Between 1950 and 1957, the total advertising influence directed to the consumer climbed 88% from $5.7 billion in 1950 to an estimated possible $10.7 billion in 1957.

In relation to the standard of living (total consumer purchases of goods and services), advertising influence jumped from 2.9% in 1950 to an estimated 3.8% in 1957.

Advertising has been a strong influence in encouraging people to improve their living standards.

These changes and trends are more than quantitative.

Great masses of people have vastly wider horizons, have new and different experiences, have changed patterns of home life, of expression, of leisure time, and of buying.

But even broader changes, than those we've seen, must occur within the next 10 yr. if we are to find markets for our increasing productive capacity.—**FE Staff**

FOOD NEWS FROM Pfizer

Quality Ingredients
For the Food Industry
For Over a Century

IMPORTANT DEVELOPMENT IN FORTIFICATION...NOW! FOR THE FIRST TIME...VITAMIN A FORMS WHICH WILL DISSOLVE IN MILK OR WATER WITHOUT AFFECTING TASTE...TECHNOLOGISTS SEE IMMEDIATE POTENTIAL FOR THESE NEW TYPE PFIZER CRYSTALETS® IN INSTANT BEVERAGE POWDERS ...OTHER PRODUCTS TO FOLLOW.

Pfizer research has developed many improved forms of vitamins which made possible new products and new competitive advantages for existing products. Now, Pfizer offers its CRYSTALETS (dry, free-flowing beadlets of vitamin A, or A & D) in two new forms—one dispersible in milk or water at room temperature, the other dispersible in milk or water that is ice cold.

Neither form affects the taste of the drink. Write for technical information on CRYSTALETS—Type W and Type M.

★ ★ ★

New Protection For Cheese Products With Pfizer Sorbistat®

A selective antimycotic agent, SORBISTAT (sorbic acid) effectively inhibits growth of many molds, yeasts and certain bacteria which cause spoilage. It does not interfere with normal microbiological curing of cheeses. Also, at normal use levels, SORBISTAT does not affect the appearance, taste or odor of any food product. Discover for yourself how SORBISTAT can keep your foods in better condition. Write for technical literature and a sample.

★ ★ ★

Want An Outstanding Emulsifier?

When you emulsify your cheeses with Pfizer Sodium Citrate, you build in quality and appeal. Your product will . . .

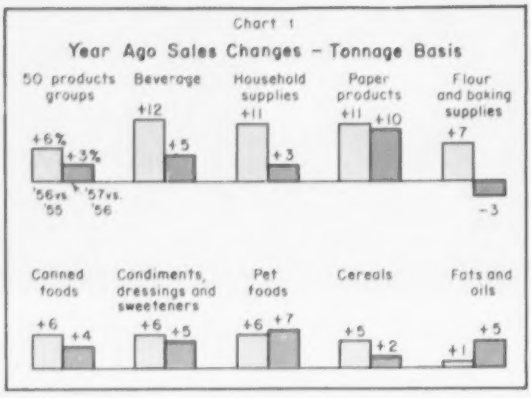
- keep a uniform "just right" texture
- melt smoothly and evenly
- spread to perfection after long storage

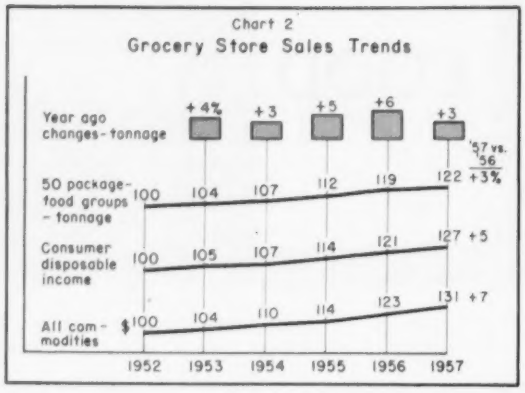
Also try it for making extra smooth ice cream. Pfizer offers a variety of forms: Sodium Citrate Anhydrous, U.S.P., VIII, and Monosodium Citrate.

★ ★ ★

Bottles Really Sparkle

By using Pfizer Sodium Gluconate or Gluconic Acid in your hot caustic cleaning solutions, you increase the efficiency of your bottle washing operations. Wide experience has proven Sodium Gluconate to be the outstanding sequesterant for preventing precipitation of calcium and magnesium salts. Write Pfizer today for complete technical information. CHAS. PFIZER & CO., INC., Chemical Sales Division, 630 Flushing Ave., Brooklyn 6, N. Y., Branch Offices: Chicago, Ill., San Francisco, Calif., Vernon, Calif., Atlanta, Ga., Dallas, Texas





10 Tips to Up Your

Leadership will go to food men who sell goods faster, better, more economically . . . Checks on costs can cure sick profits . . . Trends underscore higher education factor, also teenage influence on buying

IT'S HIGH TIME–as the curtain falls on 1957–to make sure your marketing program is shaped to build profits in the year ahead.

Certain aspects of the 1958 outlook–prospects of sales gains that may be less substantial than those in recent years, and the continued pressure of rising operation costs–underscore the importance of getting the most dividends from your marketing dollars.

Specifically, 1957 took some turns that point to the bigger–and more influential–role marketing will play in 1958.

Item: Grocery sales were up 7%, but the gain was illusory in the face of declining profits (expected to be lower than 1956's 2.9%).

Item: Rate of gain for 7 out 9 important food categories dipped behind the 1956 rate (see Chart 1).

Item: Actual tonnage gain–3%–lagged behind the 5% increase in consumer disposable income (see Chart 2).

THAYER TAYLOR
Associate Editor, "Food Engineering." (Charts 1-6 courtesy A.C. Nielsen Co., Chicago, and Charts 7 & 8 courtesy *Life* magazine)

Cost Control Program

Ten ways your marketing power can be effectively harnessed in '58 were outlined at GMA's convention last month. If you're to sell your goods more efficiently, said A. C. Nielsen's J. P. Peckham, you must–

1. Build added value into your products.

This makes your advertising more effective, widens product usage among regular customers, and wins new customers. Ways in which this can be done: Improve the product's flavor and taste, make it more palatable, redesign the package.

2. Make it easier for the customer to buy your product.

If your goods aren't on store shelves when the customer goes shopping, sales are lost–and all the marketing dollars spent on pre-selling are down the drain.

That may sound trite. But foodmen should ask themselves if they could have used a 10% increase in sales this year. For a check by Nielsen of 220 major advertised brands shows that 26% of them were out-of-stock at any one time in 8-10% of the stores handling them–and another 17% were unavailable in 12% of the stores.

Obvious solutions to these "lost" sales are closer liaison with your trade representative, and more efficient warehousing and transporting of stock.

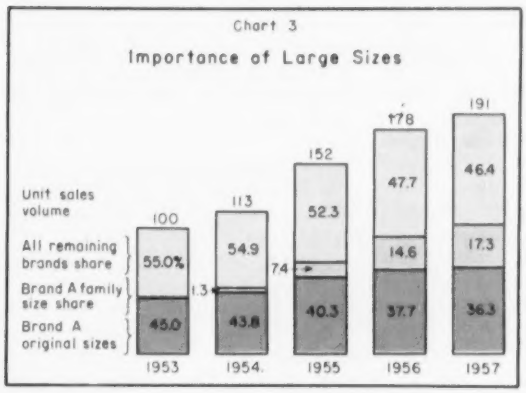
Of course, before the consumer can pick your package off the shelf, the retailer must agree to put it there. And here you run up against an avalanche of new products–about 6,000 a year–bidding for shelf space.

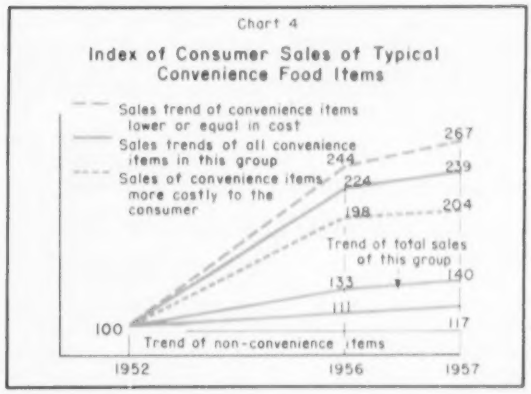
To meet this competition, your sales presentation must be effective. It must be geared to the type of store you're selling to–full of pertinent facts on the product's cost, selling price, percent of profit, advertising or promotional allowance, and deal terms.

Study your package to see if a larger size, or multiple-packs, will help consumers buy more of your product. With average household units getting bigger, larger–so-called "family"-size–packages answer a consumer need. Chart 3 shows how one brand increased its share-of-market from 45% to 53.6% by supplementing its regular package with a larger-size.

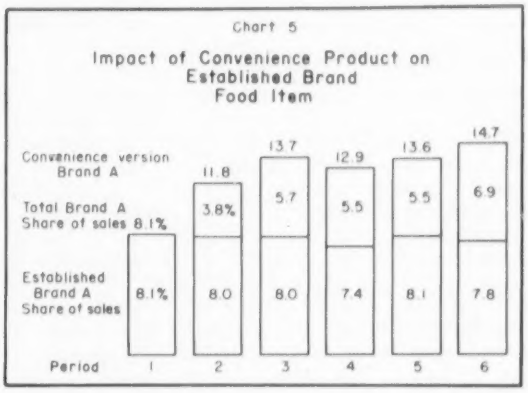
3. Make it easier for consumer to use your product.

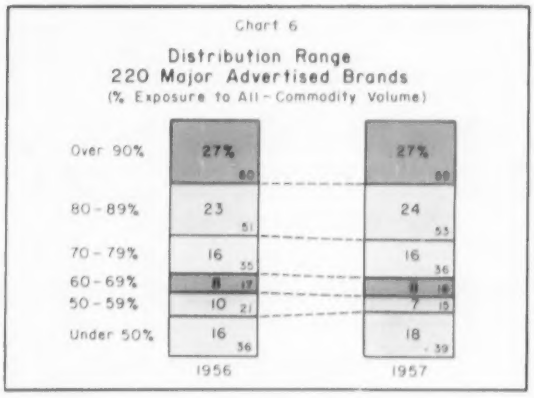
Convenience food products have been the outstanding sales gainers these past five years. The number of working mothers, the absence of





'58 Marketing





household help, the demand for less kitchen drudgery and more leisure time—all have sparked the meteoric growth of these products.

Back in 1952, Nielsen began keeping tabs on categories of convenience-type products—instant & regular coffee, frozen & canned orange juice, cake mixes and cake flour, tea bags and instant tea, etc.

Sales of these products have jumped 139% in the 1952-57 period (see Charts 4 & 5) and have lapped the overall 31% gain for grocery store commodities.

Significantly, the consumer has demonstrated her willingness to pay more for foods with "built-in maid service." Nielsen's check shows that convenience products carrying higher price tags hiked their sales 104% in the above 5-yr. span, while such products with lower prices jumped sales 167%.

4. Offer a premium brand at a premium price.

Intense price competition in 1957 scared many manufacturers away from charging realistic prices for a number of their products. But where consumers show a willingness to pay more, the time may be ripe for you to offer premium products that have plus quality values.

However, Peckham particularly warns, a premium brand must: (1) Have a superior quality the consumer believes in, (2) be backed up with substantial advertising, and (3) be a pioneer in its field.

5. Narrow the spread between your goods and the low-priced competition.

Consumers are accustomed to a price spread between advertised and non-advertised brands, but there's a limit beyond which they won't go.

The growth of private labels has spurred the necessity of pruning all production and marketing costs so that the advertised product's retail price is competitive with that of the product which is not advertised.

6. Match your sales effort with your potential.

In this era of mass marketing, your program must target the retail outlets offering the greatest sales possibilities. For example, if in a given area 22% of the stores do 76% of the business, they're the ones you should concentrate on.

According to Nielsen, 27% of the

220 brands checked were placed in outlets doing 90% or more of the total grocery store volume—meaning the brands had 90% distribution. More important, though, 34% of the brands had only 70% distribution or less (Chart 6).

Teamwork Pays Off

7. Work more closely with your customers.

This is especially required if advertising campaigns, special promotions, and store displays—all of which eat up marketing dollars—are to produce real dividends.

In the course of a 12-week study of six Super Valu stores in Minnesota, *Progressive Grocer* recorded the results of 825 special product displays. Sales increases over normal weekly performance were spectacular —dollar sales up 379%, unit sales up 450%.

Expressed another way, average sales of all the items during the display period were equivalent to 5½ weeks of normal sales.

Considering that the modern super market carries some 5,000 items, special displays and promotions are more important than ever. And since the average shopper spends 20 to 25 min. in the store, she would have to look at 260 different items each minute if she wanted to see everything available.

8. Reappraise your consumer promotions.

Coupons, giveaways, two-for-one offers may be successful for introducing new products. But they rarely generate plus-sales for established brands. Peckham warns that if promotions are continued after a new product gets on its feet, the amount of cut-price merchandise gets larger, the sales gain smaller. And eventually the brand ends up with less dollar sales volume than it started with.

9. Make your advertising appeal more effective.

Standing pat on advertising strategy can be fatal to your marketing program. During the 1946-1956 period (when food advertising skyrocketed from $336 million to more than $1 billion), three out of every ten brand leaders were toppled from their pre-eminence by more aggressive competitors, Nielsen reports.

A key to your advertising's effectiveness is in really knowing your target. Traditionally, the woman was considered the family's shopper, but her influence may be diminishing.

During the course of *Progressive Grocer*'s study, for example, women shopping alone spent 35¢ of the sales dollar, men alone 14¢, couples 21¢, couples with children 11¢, woman and child 14¢, man and child 4¢, and child alone 1¢.

Along the same lines, your advertising may be overlooking a segment of the population that consumes more of your product than its character would indicate. For example, *Life* magazine's new study of consumer expenditures came up with these eye-openers:

More than 25% of the cereal market is accounted for by families with no children and whose heads are over 40 years old, and 7% of the baby food market goes to childless families.

10. Hold more sales tests to uncover weak spots in your marketing program.

Local or sectional tests, Peckham points out, give you a good basis for estimating potential sales volume of new products, changing your advertising or package, eliminating unprofitable items, or revising basic sales policy. Of course, such a test must be carefully planned—for any misinterpretation of its results, when projected nationally, could be harmful to your whole program.

Looking beyond 1958, food managements may draw comfort from certain long-range trends indicated by the *Life* study. Says Publisher Andrew Heiskell: "Viewed from any vantage point, the economy is clearly on the food industry's side."

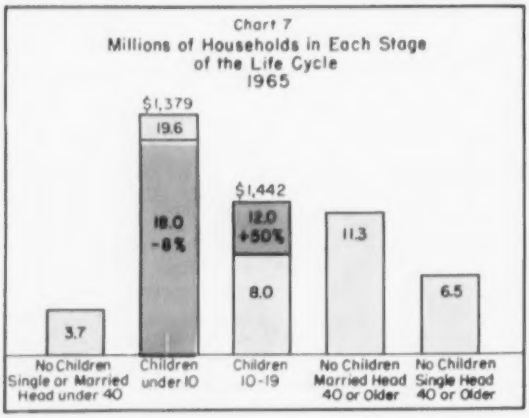
Item: As a household's level of education rises, it spends more money on food, especially those items which cut kitchen time.

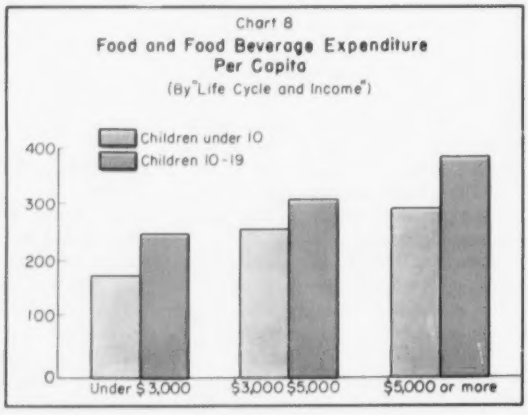
The 42% of all households that are headed by high school graduates, or higher, spend 47% of all food dollars, account for 57% of frozen food sales. By 1965, these households will increase by 7½ million.

Item: Households with teenage children have bigger appetites than households with children under 10. Families with children under 10 spend $1,379 a year on food, beverages, and tobacco—or 14% above the average for all families—while households with teenagers but $1,442 worth of those commodities—or 19% above average (see Charts 7 & 8).

The future will see households with hungry teenagers exerting even more influence on food purchases. Households with children under 10 are expected to decline 8% to 18 million by 1965, while those with teenagers are seen increasing 50% to 12 million.

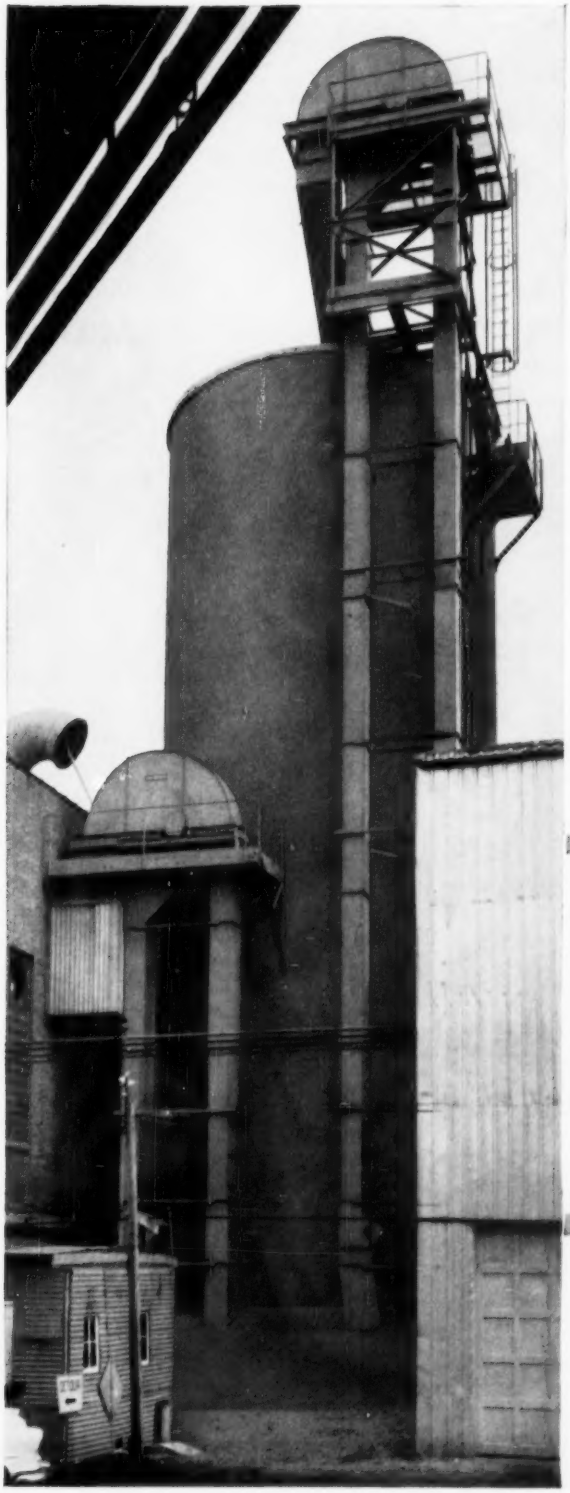
Teenage Households Mean More Sales for You





Why alignment is built into LINK-BELT bucket elevators

at the factory... not in the field



Link-Belt makes and integrates all components to speed assembly

EVER buy a "bargain" bucket elevator—then run into unreasonable installation costs? If so, you'll appreciate the ease with which Link-Belt bucket elevators are assembled. All components are carefully manufactured, assuring ready alignment. And because *Link-Belt makes them all*, they're integrated to match perfectly, operate smoothly.

At your request, Link-Belt will also accept erection responsibility. Particularly important if you're planning a new plant, this service—backed by Link-Belt's unequalled background in bucket elevator engineering—can contribute greatly to assuring over-all efficiency of your system. A Link-Belt representative awaits your call for a consultation.

- **HEAD SECTION COMPONENTS** — bearings, head shaft and sprocket—are chosen from Link-Belt's complete line on the basis of material to be handled and capacity requirements. Chains suitable for all service conditions are available.
- **INTERMEDIATE CASING SECTIONS** are fabricated for convenient assembly and assurance of accurate alignment. Casings are self-supporting. Occasional lateral tie-ins may be required where unusually great heights are involved.
- **BOOT COMPONENTS** incorporate bearings suitable for adjusting elevator chain to proper tension. Large access door makes routine inspection and adjustments quick and easy.
- **BUCKETS** — all types and sizes suitable for handling all kinds of materials are available from stock.

Designed for maximum elevating efficiency . . .

POSITIVE DISCHARGE elevators handle light, friable or sluggish materials and those having a tendency to stick to buckets.

INTERNAL DISCHARGE bucket elevators handle chips, pellets, nuts, seeds, etc. gently and at high capacity. Double head shafts operate in fixed bearings.

LINK-BELT

BUCKET ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.805

PHILCO
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Another brand-new
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automatic
EASY
DO NOT TRUCK FROM THIS
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TELEVISION

Leading brands of appliances are protected by Mead container board

Appliance manufacturers can't afford to take chances on damage to their products through shipment. So leading appliance makers insist on shipping cartons made of top quality container board . . .the kind The Mead Corporation makes.

Mead made certain of this extra quality by being first in its industry to establish a manufacturing process quality control system for its virgin kraft liners and Chestnut semi-chem corrugating medium. Backed by elaborate testing equipment, this process control starts in Mead's vast timberlands, follows through all the manufacturing steps in Mead's seven large board mills and finally ends when the board is ready for converting into strong containers.

THE MEAD CORPORATION Sales Offices: Mead Board Sales, Inc.
Cincinnati • Chicago • Detroit • Boston • Newark, N. J. • Lynchburg, Va.

MEAD
container board

A message of significance
for anyone who buys or uses cans—

Bliss is now designing, building and equipping complete can plants

E. W. BLISS COMPANY has so expanded its facilities and staff that it is now offering *complete* plant-building service to can users and manufacturers.

This "turn-key" plant concept means that we can provide a customer with everything he needs—from a survey of the economic advantage or disadvantage of operating his own plant right up to building it, equipping it, training his personnel, and getting the entire operation underway as smoothly as possible.

We will either take complete responsibility for design and construction, or work with a specialized consulting engineering firm, adding to the consultant's specialized talents Bliss' own personnel, manufacturing facilities, and long familiarity with and experience in the can manufacturing field.

For *users* of cans, the implications of this entirely new service is obvious. And the service is no less meaningful for can *manufacturers:* The regional plant—is it practical, is it economically feasible?

If you're seriously considering moves of this kind, Bliss' new "turn-key" concept deserves your thoughtful consideration. We'll be glad to talk out all the details with you. A number of our executives will be available at Bliss' booth during the Canner's Show, Atlantic City, this coming January. Or if you prefer, drop us a note, and we'll arrange an appointment at your convenience.

Bliss is more than a name . . . it's a guarantee

BLISS
SINCE 1857

E. W. BLISS COMPANY
Can Machinery Division
Canton, Ohio

FTC Against Success?

There are food marketing implications in the reasoning used by FTC in its suit against Proctor & Gamble's $30 million acquisition of Clorox. Here's gist of FTC's argument:

(1) P&G has used its merchandising ability in the past to achieve tremendous sales success with unknown products, can now use this same ability in liquid bleach market to promote already dominant product. (2) P&G can offer grocers complete line, thus increasing company's competitive advantage in obtaining display space in retail stores.

What P&G seems accused of is something most food companies have as marketing objectives. A company known for its merchandising power, and loyal brand following, will use those two factors as leverages in acquiring shelf space for new products.

Also, companies build up complete lines for the merchandising advantages of having a "family" identity for its products as well as to reduce the retailer's reliance on various suppliers.

No Room for Marketing Errors

With changes occurring more frequently and rapidly in tomorrow's food merchandising, you will have a smaller margin of error when interpreting marketing facts. The 13 most common marketing errors made, according to A. C. Nielsen's E. P. James, are the failure to:

(1) Keep product up-to-date, (2) estimate market potential accurately, (3) gage the market trend, (4) appreciate regional differences, (5) recognize seasonal differences in buyers' demands, (6) establish advertising budget by the job to be done, (7) adhere to policies established in connection with long-range goals, (8) test-market new ideas, (9) differentiate between short-term tactics and long-range strategy, (10) try new ideas while your brand is climbing, (11) integrate all phases of the marketing operation into an over-all program, (12) objectively appraise your competitor's brand, and (13) admit defeat and profit from your errors.

Bottlers Tap Bigger Markets

Four-fifths of Coca-Cola's domestic bottlers now market the larger 10-, 12-, and 26-oz. bottles, along with the 6½-oz. About a third of the beverage now is consumed in the home, making the larger bottles important.

Coca-Cola is experimenting with fruit drinks, but denies plans to market either these or a canned beverage in the near future. C-C's sales were up 7% for the first half of 1957.

Aiming at a national market in a few years, Dr. Pepper has licensed bottlers in Detroit, Toledo, and Jacksonville, with more to be added. Wider distribution will minimize the effects of poor regional weather, such as this year's cool rainy conditions in the Southwest, Dr. P.'s stronghold.

Canned soft drinks seem to be doing better. For the first half of this year, volume moved in MiraCans was 24% higher than the '56 rate. Nehi is a leading user of the container that, though relatively expensive, has disposal convenience and is lighter than the bottle.

One way of balancing the summer peak in domestic beverage sales is to do equal business on the other side of the equator. This Pepsi-Cola has in mind as one factor in doubling foreign operations, within three years.

In better areas previously served through jobbers, Canada Dry is substituting licensed bottlers. The purpose is not only to vitalize local promotion and distribution, but to eliminate the cost of transporting bottled beverage from company plant to jobber.

Emphasis Shifts to Consumer Needs

The revolution in food marketing has shifted the emphasis from "selling what we make" to "making what will sell."

So Robert E. Kahl, Borden's national advertising manager, told the Boston Conference on Distribution.

Finding what the consumer needs, wants, and will buy shapes the success or failure of food products, he says. Successful marketing programs, he adds, must include: Market analysis and trends, consumer research, product development and testing, packaging, advertising, sales promotion plans, and test marketing.

Briefs

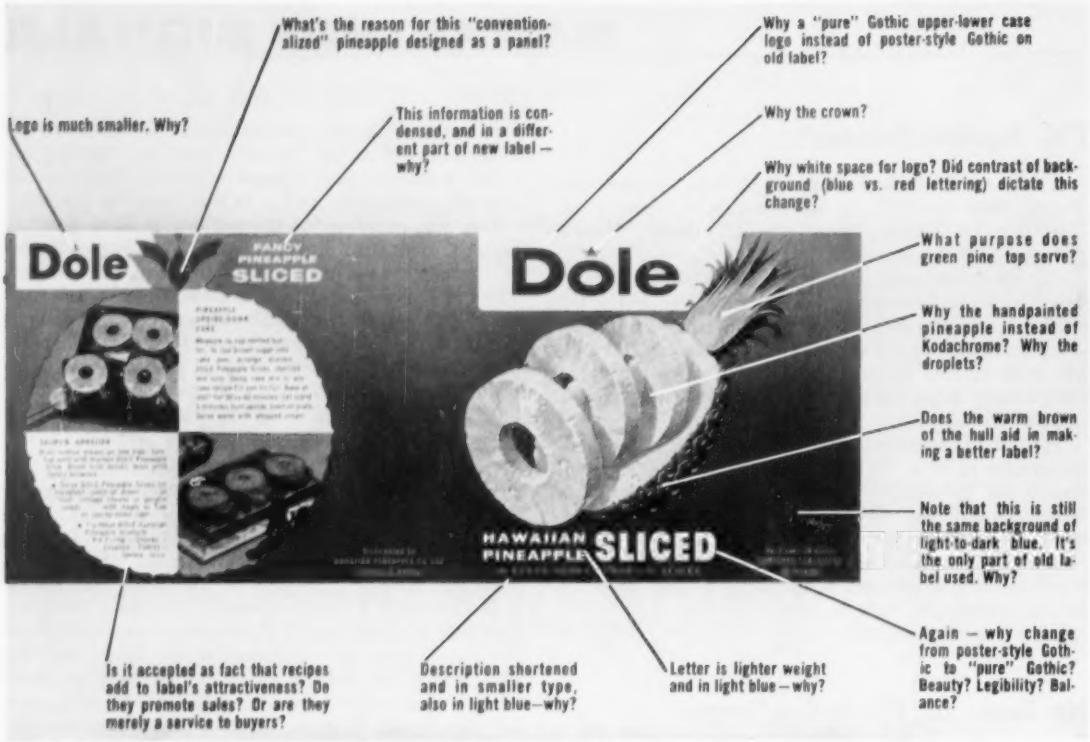
Alert merchandising by Florida Citrus Commission, pegged to Asiatic flu publicity, is hiking orange juice sales. Special promotions, activated in cities where flu cases showed striking increases, upped juice sales 300% in Cincinnati, 30% in Chicago, for example.

General Food's gourmet line of 95 items is catching on. Company has placed the line in 200 stores, hopes for 1,200-1,800 by next spring. One surprising note: Popularity in rural areas has exceeded GF's expectations.

Biggest coupon promotion ever run by a canner in the New York area was exploded recently by Libby, McNeill & Libby. It mailed ten 10¢ coupons on top volume items to more than 3,000,000 homes. Supporting advertising barrage included 44 newspapers, 50 TV spots, 250 radio spots. Libby will confine the promotion to N.Y.C. region, plans to back it up with local advertising through next June.

Can air-conditioning be a marketing tool? D. L. Clark Candy Co. thinks so, reports that air-conditioning of warehouses enabled company to increase candy inventories, assuring faster deliveries to customers. Innovation extends product's shelflife to 6 to 8 weeks, depending on weather, company adds.

Bakers finally have a national slogan after years of discussion: "Enriched Bread Enriches Health." Theme was adopted at recent American Bakers Assn. convention, and is seen helping manufacturers gear promotion to increased emphasis on food nutrition.


What's the reason for this "conventionalized" pineapple designed as a panel?
Why a "pure" Gothic upper-lower case logo instead of poster-style Gothic on old label?
Logo is much smaller. Why?
This information is condensed, and in a different part of new label — why?
Why the crown?
Why white space for logo? Did contrast of background (blue vs. red lettering) dictate this change?
Dole
FANCY PINEAPPLE SLICED
Dole
HAWAIIAN PINEAPPLE SLICED
What purpose does green pine top serve?
Why the handpainted pineapple instead of Kodachrome? Why the droplets?
Does the warm brown of the hull aid in making a better label?
Note that this is still the same background of light-to-dark blue. It's the only part of old label used. Why?
Again — why change from poster-style Gothic to "pure" Gothic? Beauty? Legibility? Balance?
Is it accepted as fact that recipes add to label's attractiveness? Do they promote sales? Or are they merely a service to buyers?
Description shortened and in smaller type, also in light blue—why?
Letter is lighter weight and in light blue—why?

NEW Dole label was the result of answers to several questions which you see grouped around the above illustration.

Getting Sharper Competition? *You* May Need a Label Change

Take Dole. It's old label had strong consumer acceptance. Yet it has now boldly adopted this new one—geared both to today's aggressive marketing and the company's now-diversified product line . . . Stressed is "sellability", with striking illusion of motion

IS IT WISE to tinker with the design of a well-known, highly accepted label that holds a clear lead in the marketplace?

Yes—when such a move is salient for keeping abreast of the changing demands in today's competitive food business.

The avalanche of new products, the pressure of mass promotion, and the increased importance of self-service in food stores—all these point up the necessity of keeping your marketing tools well honed.

And your package can be a sharp tool for cutting you a bigger slice of the consumer's purchases.

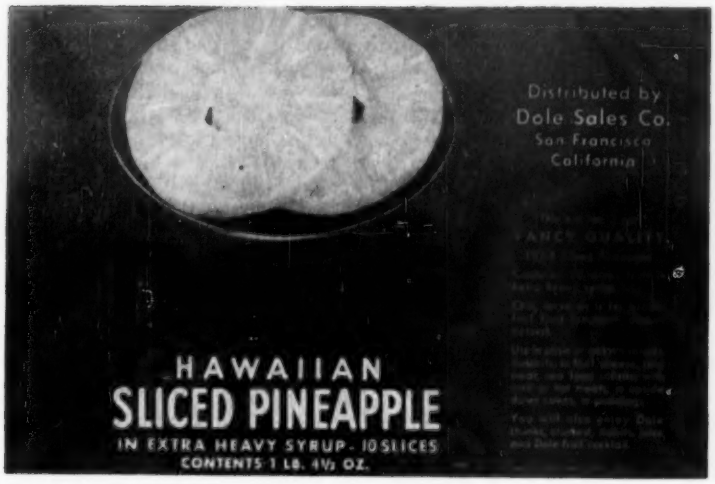
This kind of awareness of package design as a key marketing tool led Hawaiian Pineapple Co., Ltd., San Jose, Calif., to boldly change the design of its familiar Dole label—even though that label was synonymous in the consumer's mind with top quality pineapple products.

Not content to stand pat on its old label, the company recognized that today's food market, with its ever tougher competition, calls for most aggressive marketing. And management knew that the package's degree of impact in the retail outlet is the final factor in getting consumers to buy.

A number of reasons sparked Dole's radical decision. Significantly, marketing studies had indicated that consumers 'glance-identified' the label with pineapple products.

This one-product identity limitation could slow up the company's ambitious expansion program, which is switching Dole from a one-product outfit to a multi-product one.

C. R. HAVIGHORST
Senior Associate Editor, "Food Engineering"



OLD package design had served Dole well in the past, but was in need of a new dress to keep in step with the company's more diversified line.

Groundwork for the expansion has been laid with the purchase of F. M. Ball & Co., Oakland, and Paulus Bros. Packing Co., Salem, Ore. These mainland canneries enabled Dole to diversify its line with fruit and vegetable products.

Several new products—fruit cocktail, tomato juice, pears, peaches, cut green beans (all canned), pineapple-grapefruit juice blend (frozen & canned), and pineapple-orange juice blend (frozen)—have already been test-marketed successfully. Other new products scheduled: Sliced green beans seasoned with onions and peppers, and cored baby peppers.

A package design to provide family identity for, and give selling impact to, the increased number of products became a marketing objective.

Dole chose a New York industrial designing firm, Frank Gianninoto & Associates, to work with marketing and procurement personnel to come up with a new label. The designer, after studying the old label, decided to keep its best elements, so as to retain the established consumer recognition, and then go on from there.

First, about the vignette: The food-product illustration is recognized as of No. 1 importance in the package design. The aim is to create irresistible appetite appeal. And this visualization should include other elements that dramatize the effect.

Analysis revealed that the old Dole vignette fell short of doing this. Colorwise, the label's background was light blue in the upper portion. This hue gradually deepened to dark blue at the bottom. Contrast was thus provided for the yellow-colored fruit.

However, the reproduction of the product, by colored photo, lacked depth and perspective. It made the fruit appear as an indistinct and rather flat, yellow-colored mass.

The only warm, appetizing color in the label was the crimson "Dole" logotype. But the contrast of the two colors (dark blue vs. crimson) overwhelmed the product's weaker yellow color.

Gianninoto created new product illustrations with a warmer and fresher "direct from the fields to you" look. He did this by using a halved pineapple, complete with bright green leaves, as a background for Dole's various pineapple products.

Carrying this illusory technique even further, he gained another "warm" appetizing color in the hull of the halved fruit: In the new label, pineapple slices of generous size are sharply emphasized by highlights and shades of rich yellow color in the artist's oil painting. The highlights seem to emerge from the fruit.

Taking a bit of artistic "license", Gianninoto added droplets of juice to the halved fruit and slices to depict it as just sliced, dripping with juice. Thus, with more elements in this painting (there are three slices and the halved fruit), the artist achieved a perspective that gives depth to the illustration and greatly enhances its impact value.

Another significant change from the old label, which had two identical sides, is the substitution of a cartouche (on the back side) for the former vignette and logo.

This pineapple-silhouette cartouche, with topping of green leaves, is treated in a stylized manner. It contains two illustrations of recipe food and printed recipe instructions—a strong "sell" effort to expand use of the fruit as in the dishes pictured.

New Logo—New Copy

Much of the consumer's familiarity with the old package was related to easy recognition of the crimson logotype and the two-toned blue background. The latter, connoting the blue sea of the Hawaiian Islands, achieved a cool, fresh effect, just as should fruits and fruit juices when served.

At the outset, Gianninoto was reluctant to use this crimson-and-blue combination for the new package. The two-tone treatment is now termed old-fashioned. And the old red logo, set directly against the deep blue, is considered difficult to read because the combination of the two hues sets up a luminosity or vibration effect that makes for illegibility.

However, a market study preceding the actual design work showed that the two-tone background had excellent recognition and recall value. This held true not only when it was viewed among other competitive labels, but also with all labels

LARGER IMAGES of product give greater impact and eye-appeal. "Direct from fields to you" look is achieved by showing product resting on halved fruit.

DOLE'S ANSWER to important packaging need—attractive and easy-to-use recipes. Printed in silhouette-like cartouches, they're pleasingly balanced with prepared-dish vignettes that stimulate buyer's appetite.

of canned fruit and vegetable items.

After a futile effort to use another background color, the designer conceded that this was a case that broke precedent. No other color combination carried the same association with Dole—other colors looked dead.

Solution was to use the same background and the same crimson for the logo—but with placement of the word "Dole" in a white panel at the very top of the label. This increased its readibility and easy recognition.

Another change was the substitution of upper and lower case gothic type for the all upper-case lettering of the old label. The new logo is thus easier to read. It also seems less formally conventional—more friendly.

The logo and product description took up a full half of the old label. As for the new logo, the designer reasoned that the smaller "Dole" name, by its sharper, easier reading won just as much prominence as the nearly 1-in. high lettering did on the old label.

The designer knew it would be far better to increase the size of the product illustration. The larger it was, the greater the impact and eye-appeal. And after all, it's the product that the customer is interested in buying.

Symbolic Crown

Adding to the distinction of the new logo is a stylized, leaf-green crown, shaped like pineapple leaves (see photo). It symbolizes quality—a mark of "nobility" such as "Royal Hawaiian".

The green leaves of the halved pineapple are superimposed over part of the logo's white panel. This ties the "Dole" visually to the product description at the bottom.

On the other side of the label, this same logo is repeated on the left above the cartouche. For balance, a block of white type, describing the kind of product, is located opposite on the right.

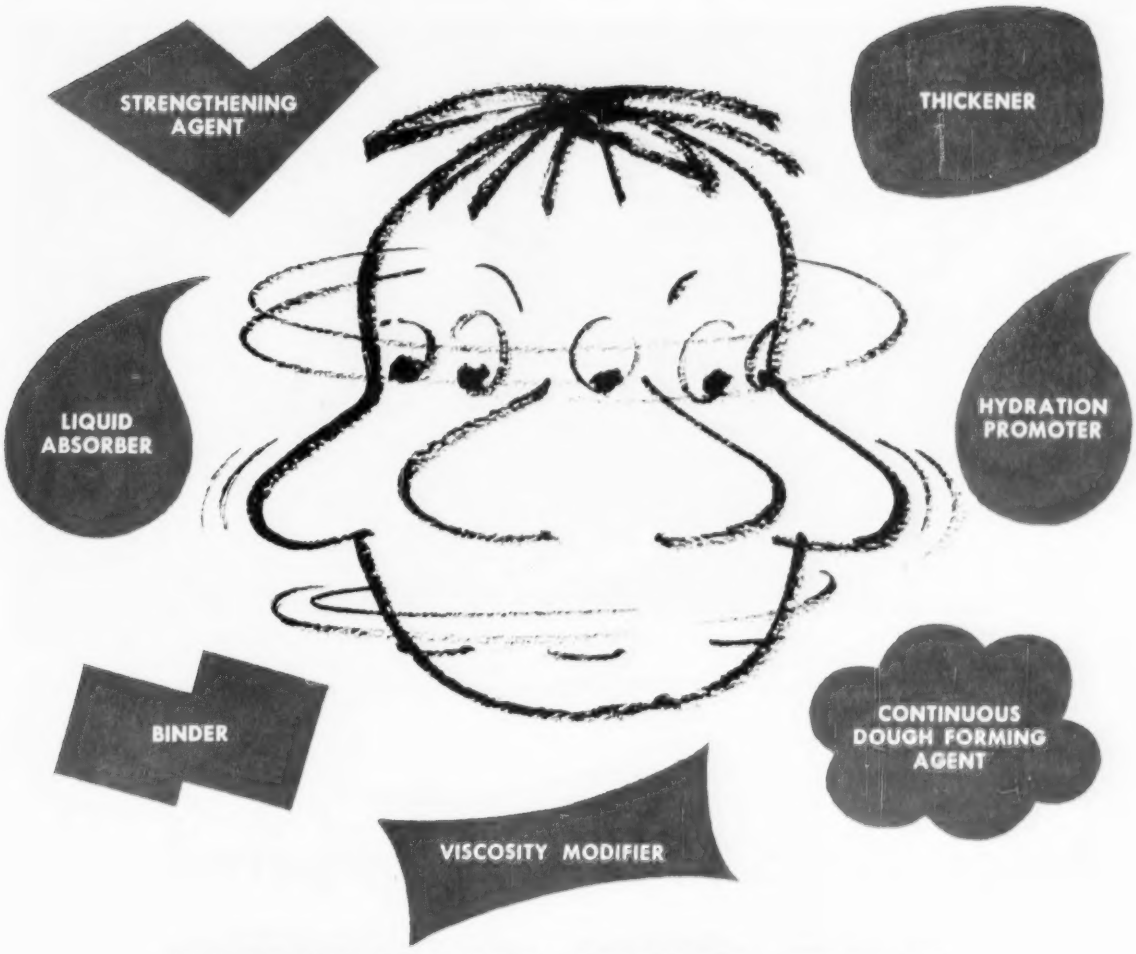
The new design employs a different layout for the product description on the front of the label. Instead of the elongated, hard-to-read, modified Gothic type, a conventional bold Gothic in white is used. And to reduce reader confusion, the remainder of the description, formerly in white, is now in light blue.

Contents description (legal requirement) appears at one side of the label, between the front product illustration and the cartouche.

The impression one gets from the startling perspective of the product illustration is an illusion of motion. The pineapple seems to be moving toward the viewer.

The choice of colors and design is striking. This label, when placed among the hundreds of others on the retail shelves, will successfully compete for consumer attention.

Dole plans to back its label change with a strong 1958 merchandising program. Although the new label is now in general distribution, the company will stress it in its promotion campaigns after stocks of the old label are used up.



WHAT IS PRO-80?

Economical Source of Concentrated Protein— with many processing bonuses

More and more food processors recognize the fact that "Protein Enriched" on their food label means greater sales volume. General Mills Pro-80 Vital Gluten is 80% wheat protein (m.f.b.). It adds sales stimulus to existing foods, helps create protein-rich premium-priced products.

Pro-80 can assist in processing of food products in many ways. For example:

Pro-80 serves as a binder in cereals and meat products.

Adds "bite" to macaroni and spaghetti.

A meat substitute in vegetarian products.

Strengthening agent in pretzels.

Continuous dough-forming agent in yeast-raised baked goods.

Liquid Absorber in gravies and meat pies.

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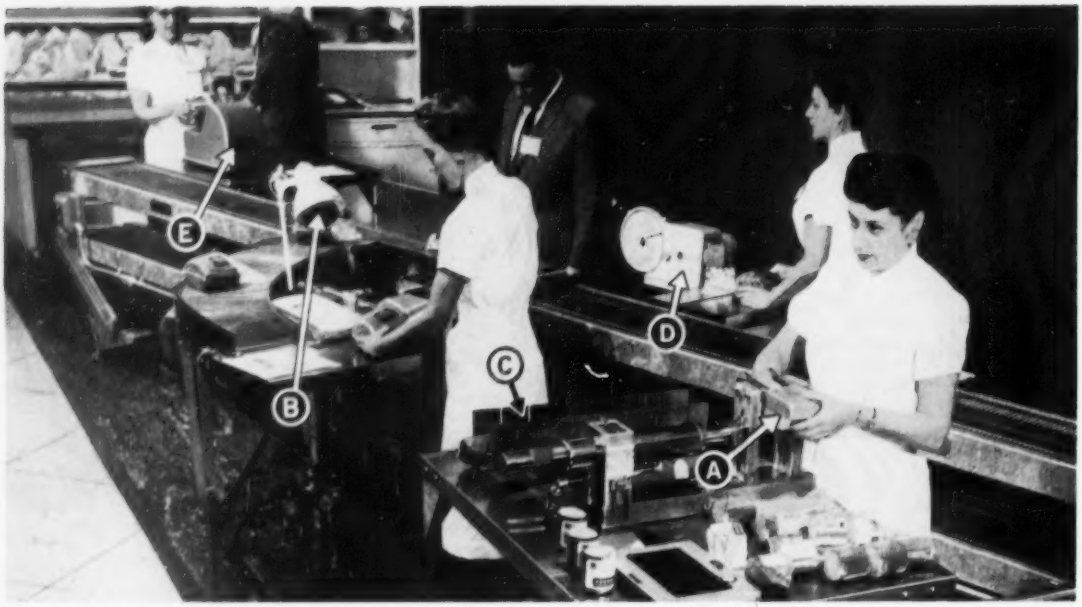


VERSATILE NEW PACKAGING line employs self-tightening plasticized vinyl overwrap film to produce a snug package for wide variety of meats. Here, Visking's "Tite-Wrap" machine (A) stretch-wraps chunks and frankfurters. Heat lamp (B) keeps Visten bags flexible to speed packaging. Miter box (C) cuts bologna into uniform chunks. Bagged items are aluminum-clip sealed (D) and conveyed to check-weigher (E).

Meat-Wrap Problems Targeted

Progress slow in brand-packaging fresh cuts. Preservation link seen key . . . But films, coatings build new protective and selling values. And mechanized packaging makes strides

CONSTANT IMPROVEMENT in packaging is a must for any food company intent on holding the pace.

This need is especially critical in the meat field, where there has been a lag in development of branded merchandise geared to today's self-service retailing.

Recognizing this, the packers are now in action. They're giving more serious thought than ever to: (1) Building brand identity for the fresh meats that account for better than 90% of the output, and (2) developing for processed meats better packaging materials and machines with cost-cutting potential.

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

Biggest problm relates to brand-indentity packaging of fresh store-sold meats conventionally lacking packer identification. However, efforts toward packaging at the packer level run afoul of the oxygen dilemma.

Fresh red meats need oxygen for appetizing color, but that same oxygen also sets in motion certain spoilage factors. Consequently, the sales life of fresh meat is but two or three days.

To get over this hurdle, packers are studying supplementary preservation techniques which would extend shelf-life and so open the door for a bigger role by modern packaging.

Freezing is looked upon as one solution. But Swift's experience indicates need for a tremendous consumer education job. Thus enthusiasm for freezing has tapered off.

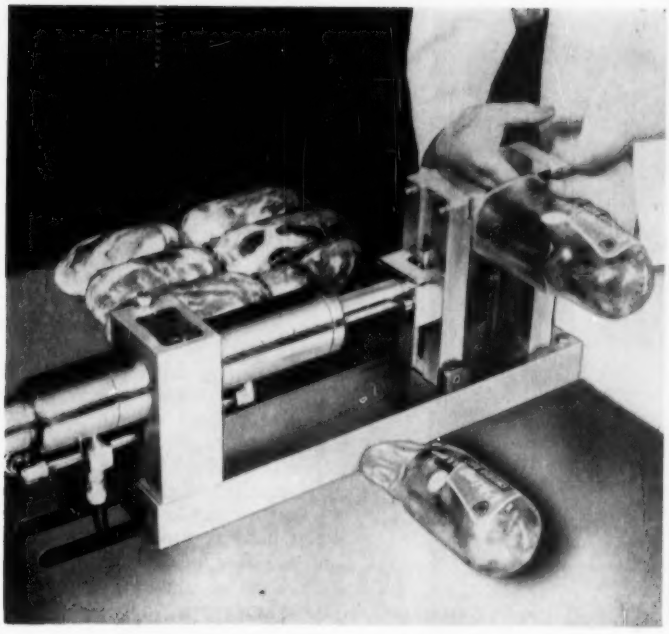
Nevertheless, it still has a great potential for meat packers.

Latest trend in this direction is Armour's home-freezer pack of red meats, aimed (1) at the growing home-freezer market (120 million cu. ft. of storage space, enough to hold 3.6 billion lb. of frozen foods), and (2) at retail stores, locker plants, commissaries, and general food-services that can't handle the usual institutional sizes.

Armour's line has 13 items, including steaks, chops, patties, cutlets, and stew meats. These items, varying from 4 to 18 oz., are individually inner-wrapped in vac-sealed, transparent plastic bags, which are packed in 3 to 4½-lb. cartons. And 6 to 12 cartons are put up in a shipping container.

As for other preservation techniques: Freeze-drying is too expensive, and commercial irradiation is still some distance away. An acceptable antibiotic—as used on poultry and fish—could extend shelf-life.

The packaging picture is much



CLOSER VIEW of machine shows self-tightening film applied, under tension, to smoked butt. Because film tightly conforms to product's shape, no shrink tunnel is needed.

brighter for processed meats—luncheon items, hams, sausages, frankfurters, bacon, as well as various canned and frozen specialties.

Work on Films

There's a lot of development going on with films. Suppliers are redoubling their efforts to turn out new materials to improve package appearance and to give better product protection at lower cost.

Emphasis is more on package performance and eye-appeal (to compete at retail level). And there's particular evidence of the use of more cling-type transparent films.

Such snug-fitting wraps—principally for whole meat cuts—are achieved by: (1) Employing stretch-films that snap back, (2) using heat-shrinkable (hot air or water) films, and (3) pulling a vac to collapse films.

Typical self-tightening film is Visking's Visten—a 1½- to 2-mil, MIB-approved plasticized vinyl. Film and Tite-Wrap machine can handle greasy, odd-shaped items ranging from 10-oz. chunks to 20-lb. hams at speeds up to 450 per hr.

Easy-to-heat-seal film punctures with minimum splitting when employed for rough-surfaced items like smoked tongue, pepper loaves, etc.

For practical purposes, heat-shrinkable films are as effective in product protection as vac-sealed packages. Making inroads into the meat-packaging field are such heat-shrinkables as polyethylene, cross-tensilized Pliofilm, oriented Mylar, and Cryovac.

Oriented Pliofilm is a cast rubber-hydrochloride film pre-stretched longitudinally and across the web. During this orienting, the film's physical properties are changed to impart strength and stretchability.

Film shrinks back to form a snug wrap, once the meat is packaged. Then wet or dry heat (180 to 200F.) is applied to expel air and avoid space for mold growth or sliming.

The wrinkle-free wrap heat-seals with a strong seam. It's greaseproof, transparent, printable, tear-resistant, and dimensionally stable with changing humidity.

Interesting, here, is the new use of oriented Pliofilm, along with the Hayssen wrapping machine and Great Lakes shrink tunnel, to produce a tight, transparent, wrinkle-free sliced bacon overwrap.

Heat-shrinkable, oriented Mylar was first used by Wilson as a strong, skin-tight wrapper for ready-to-eat hams. Packers are showing increased interest in it for more heavy meat items to minimize spoilage from torn packages.

Cryovac, of course, has been an old stand-by as a heat-shrinkable material for the packaging of odd-shaped and other meats.

Some packers feel that stretch or heat-shrinkable films do the same protective packaging job as vacuum packing—and without the need of going into the expense of this extra operation.

Vac packaging does a good job but, as yet, production rates are still off because of some leakers. As a result, there's a continuing search for better heat-sealable films.

Notable in the improvement of packaging properties significant to packers are the coated films—polyethylene coated to cellophane or to Mylar, and Saran to cellophane, polyethylene, or Mylar. These coatings, of course, increase the utility of the base film.

The polyethylene-cellophane combination has been used for vac-pouch packaging of sliced luncheon meats on Flex-Vac machines. With recent development of Marathon's attractive Advac consumer package, sliced luncheon meats are now appearing in heat-sealed, vacuumized polyethylene - cellophane pouches. The pouches have die-cut sleeves for rigidity and a multi-color area for brand and product identification.

More recent is a tear line developed on the film pouch by Kosher Zion Sausage Co. for easy opening of the sealed ear. This overcomes the previous difficulty of opening the vac-sealed pouch.

The Saran (modified vinylidine chloride copolymer) and Mylar combination is a new material, tailor-made for heavy items like hams that demand moisture and gas control and heat-sealability.

The boil-in-bag package (Mylar-polyethylene combination) is gaining more use for specialties like sliced corned beef and meat-containing frozen foods.

Another new combination—Saran

"AIRPLANE WING" carton for pouch-packed shingled meat slices stands up better under rough handling. It was created by Morton Goldsholl Design Assoc., Chicago.

coating between plies of Mylar and polyethylene—is finding use as a premium package for vac-packed process meats. Significantly, the Saran-cellophane combination has lower MVTR (moisture-vapor transmission rate), better clarity, and improved grease resistance as compared with other grades of cellophane.

Saran-coated polyethylene is an effective gas barrier, hence is important for vac- or gas-packaging.

Although Saran improved polyethylene's clarity, the combination has poor grease resistance and is difficult to heat-seal. Sealing difficulty, however, may soon be overcome with development of a two-side-coated, heat-sealable film.

Packers would like to see a suitable plastic coating—possibly made from polyesters or acetoglycerides—to perhaps eliminate film-packaging of sliced luncheon meats or whole meat items. Such coatings would reduce packaging costs, since products would simply be conveyed in and out of dip tanks.

A new attention-getting meat package that sparks impulse sales is launched almost every day. Imaginative ideas are evident in skillfully designed packages featuring more space for color and brand identification to create an impact in display cases.

Also emphasized is development of new packages for more economical and efficient operations.

Packers are keenly aware of the selling burden on their new packages in self-service stores. For this reason, their packages are appearing with new rotogravure wraps and taste-tempting carton vignettes.

Take Rough Handling

Packages are also getting added strength to hold up better under hard handling. Just out is a new carton for Vienna Sausage Mfg. Co., Chicago, that is camber-shaped like an airplane wing. Designed to take shingled meat slices, it provides structural strength.

More convenience is being built into packages—as witness the new flap closures, tear strips, single-portion sizes, etc. They stress "no fuss, no muss."

For instance, there's a new zip-open cylindrical foil-lined fiberboard container for carrying pre-formed sausage patties that pop out of the package and into the frying pan. Additional features of this package, developed for Independent Meat Co., St. Louis, is a metal top that fits back on the partially used container.

Another example is a disposable, formed tray, with die-cut and printed polystyrene cover for Brown 'N Serve sausages and similar products. The tray's bottom is formed to the shape of the sausage.

Cost Angles

With profits less than 1% of the sales dollar, packers are more deeply concerned with the cost of packaging materials. Especially so since the smaller size products require more packaging material per unit carton.

Moreover, packers can no longer afford high packaging line costs. Cheapest labor on these lines amounts to 3¢ per min.

For this reason, packer are looking for machines that do away with the cost of bags as well as the handlings now required to open, pack, and seal bags and also transfer them on and off of conveyors.

One answer is adoption of machines that automatically form roll-fed stock into pouches, which are then filled and sealed (heat or aluminum clip).

Some units will also pouch-package meat products by vacuum and inert gas techniques. Typical are the Campbell, Cryovac, Flex-Vac, Kartridge-Pak, and Wrap-King machines.

Once packers gain more technical experience in selecting machine-handled packaging materials, and in improving packaging-line efficiency, volume sales will, accordingly, increase.

One trend is toward unitizing of goods in packages, so that these items may be machine handled without need for any check-weighing.

Frankfurters, commonly put up in 1- and 2-lb. units comprise a big volume item here. And there's been a need to package them by count. Conventionally, franks of non-uniform lengths and widths give variable weight packages that are too tight or loose.

Thus, a new frank wrapping machine (Wrap-King) is now winning acceptance. It handles up to 75 packages (1-lb.) per min.

Taking roll-fed, heat-sealable cellophane, Pliofilm, Saran, etc., as well as the supporting carton, this unit handles odd or even frank counts and forms a tight neat package.

The Wrap-King, along with heat-shrink tunnel, also works well with heat-shrinkable films.

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Simple 3-step opening. ***It's just one way they're . . .***

Putting New Convenience

Once tough for the housewife to handle, the paper-body metal-end container is now really easy for her to use as a result of new unwrapping features and dispenser tops

IN THE AVID SEARCH for new containers to satisfy milady's craving for convenience, processors are giving increasing attention to the paper-body metal-end can.

There was a time when this package, with its tightly crimped ends, was regarded as only slightly easier to open than Fort Knox. But new manufacturing techniques are now incorporating a variety of unwrapping devices and dispensing tops—putting the paper can high on the "practical" list:

Refrigerated biscuits, it may be noted, are exclusively packaged in this manner. And a host of other products—including grated cheese, bread crumbs, cookies, teething biscuits, crackers, flour, and even sausage—have recently been launched in this type package.

Some Unusual Specs

There are three basic types of paper cans now on the market. Oldest is the spiral-wound package, in which the layers of paper run diagonal to the two axes of the container. A newer type is the convolute can, where many layers of paper are wound around a mandrel in a direction parallel to the horizontal axis. This package incorporates a tear-string opener. The third, and newest form, is the lap-seam paper can. It is made in a manner similar to a tin can, and is opened at the side seam with a tab.

For biscuit dough, these cans range from 2 to 2¼ in. dia. and from 4½ to 5½ in. high. (10-biscuit size). But a new half-package size, just marketed by Dixie Pride, contains five biscuits.

Containers for other products vary greatly. For example, King Kone Corp.'s can for crackers measures 2x7¾ in.

TEAR TABS and removable spiral labels make it easy to get at modern convenience products, such as refrigerated biscuits and pork sausage patties. Dispenser tops have broadened use of the paper can to other products—notably flour, bread crumbs, and grated cheese.

In Paper Cans

Whatever the size or formation of these cans, however, they all contain two important features when used for refrigerated biscuits: First, great strength; and second, what might be called "intermittent" permeability.

For, when the biscuit dough is introduced into the container, it only partially fills it, then immediately begins to swell as the leavening action takes place. This creates considerable internal pressure. To prevent an excessive buildup, and to fully expell the original air content, all of the paper cans contain provisions for venting.

In one case, at least, this takes the form of an internal notch in the lid. In another, the lid compound reportedly permits the gas to pass, then tightens up to fully seal the contents.

Generally, however, the gas flow is actually stopped by the product itself, as the swollen dough covers the cap seams.

The original, hard-to-open spiral can has given way to a new design with improved features. Used by both Ballard and Pillsbury Mills for their lines of refrigerated biscuits, this container (R. C. Can Co.) has a colorful foil wrap that is first removed by pulling a clearly marked tab (see composite photo).

A sharp rap on the underlying chipboard section splits the windings, and carbon dioxide pressure in the container pushes the package open, revealing the biscuits.

Four-color rotogravure is used for the paper-mounted foil label. At Pillsbury, the container is filled by a machine of company design, then sealed on standard, double-seaming equipment.

Because of the suitability of this type of container, and the large number of small converters that manufacture it, most products, such as cookies, flour, salt, and breadcrumbs are also packed in spiral wound units.

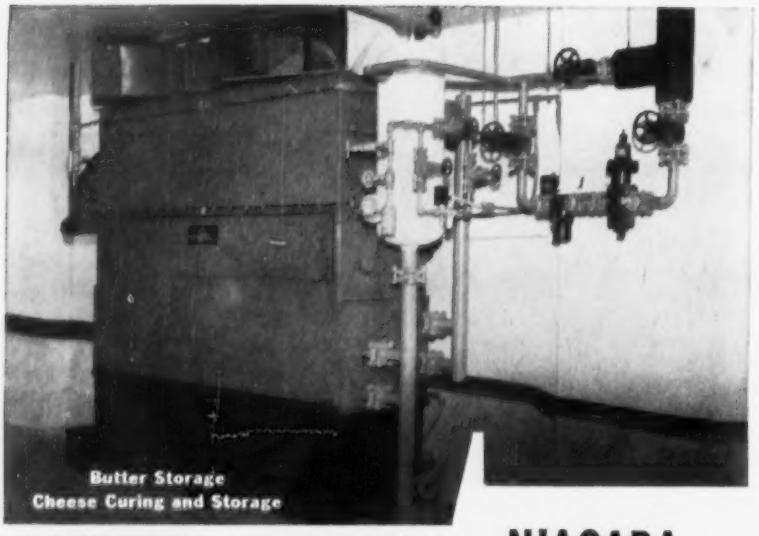
Greatly improved dispenser tops and well-designed foil labels (exemplified by Pillsbury's new flour-sifter can) have served to increase the flexibility of this package.

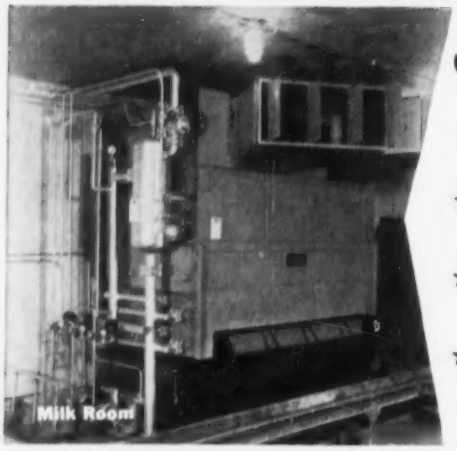
Tear String for Convolute Can

Opening speed is markedly faster in the convolute-wound can made by Sefton Fibre Can Co. This one is used by both General Mills and Ready-to-Bake Foods, Inc., (for refrigerated biscuits), and by St. Louis Independent Packing Co. and H. J. Heinz (for sausage and teething biscuits, respectively).

The tear-string is imbedded in the winding process. When pulled, it divides the container into two equal halves. The biscuits (or sausage) are

HIGH-SPEED CLOSING of refrigerated biscuit cans is accomplished on standard double-seaming equipment at Borden Co., New Brunswick, N. J. Unit operates at 275 containers per minute.


Butter Storage
Cheese Curing and Storage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contained in an inner foil wrapping that is pleated. This allows for expansion of the biscuits after packing.

Manufactured from four plies of kraft paper, bonded with resin adhesives, this container is closed with 0.009-0.011-in. tin lids (phenolic inside, plain outside) that are attached by standard crimping machinery.

Lap-Wound—Fastest Opener

Newest member of the paper-body can family is the lap-wound container, made by American Can Co. and presently used for Borden's refrigerated biscuits.

Formed from a single sheet of 17-point bleached kraft board, laminated on both sides with 0.0035-in. foil, this can requires only a slight tug on a broad, triangular tab at the side seam to open the entire contents to view.

Secret of this container is the special, hot-melt adhesive used for the side seam. This resin-type glue has a very high shear strength, and thus prevents the container from popping open under the internal pressure. But its "pull" strength is low—thus minimizing opening effort on the part of the housewife.

For added protection against moisture-vapor transmission and corrosion, the inside foil surface is heavily coated with an amorphous wax-and-resin blend. This is made especially heavy at the side seam to cover the raw edge of the kraft board.

The outside foil label is lacquer-coated.

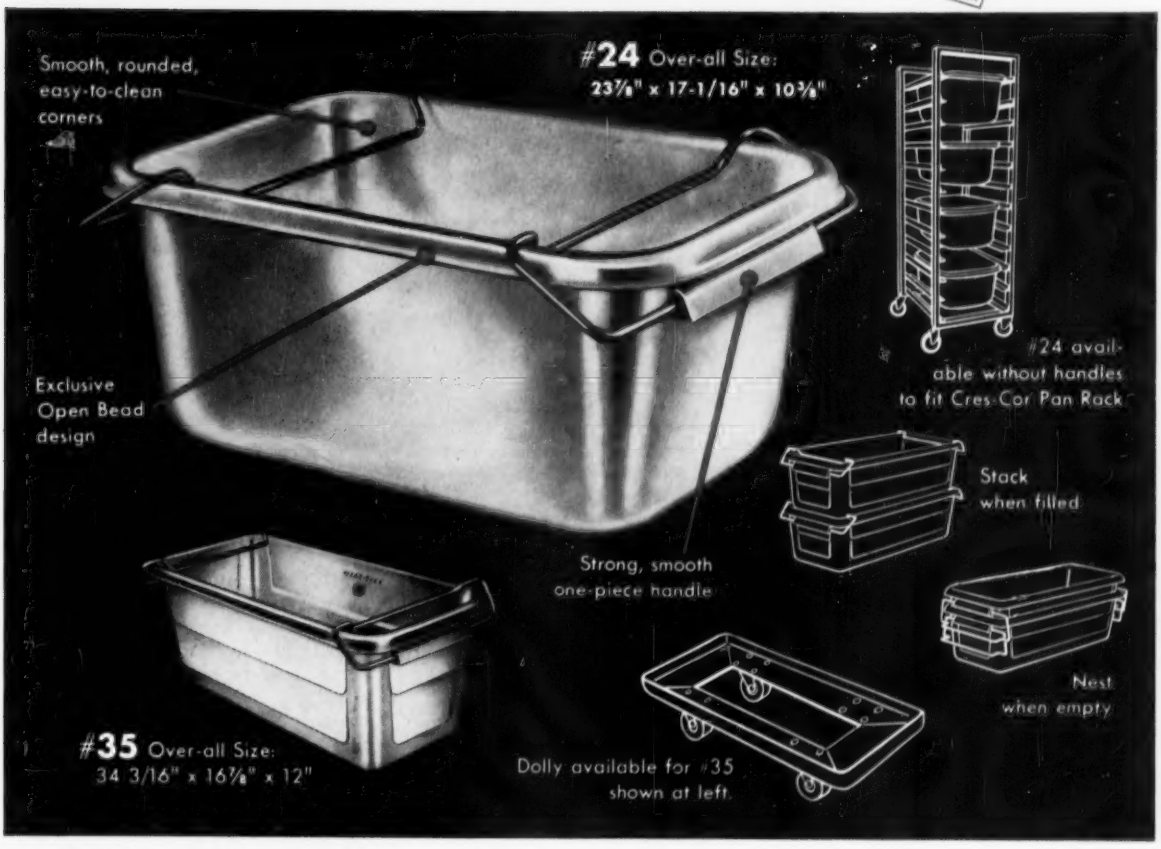
End caps (80-lb. plate) are attached with standard double-seam equipment.

"We're going out for a 'you-know-what' break."

now . . . handy smaller size . . . new features

Tote Boxes

by WEAR·EVER


Smooth, rounded, easy-to-clean corners
#24 Over-all Size: 23⅞" x 17-1/16" x 10⅜"
#24 available without handles to fit Cres-Cor Pan Rack
Exclusive Open Bead design
Stack when filled
Strong, smooth one-piece handle
Nest when empty
#35 Over-all Size: 34 3/16" x 16⅞" x 12"
Dolly available for #35 shown at left.

You asked for it . . . a smaller version of the famous Wear-Ever #35 Tote Box. It's our new #24, shown at top in the above illustration, and it's available *now*.

We've designed it particularly for you whose needs call for a lighter, smaller, easier-to-handle container. It is available without handles, to fit perfectly in a Cres-Cor pan rack.

This new box incorporates the same quality construction features as our standard size box—special extra hard wrought Wear-Ever Aluminum Alloy, sanitary open bead and extra strong, double-embossed bottom.

Like its big brother, shown in the smaller photo, this new box stacks when full, nests when empty and is available with your identifying imprint on side or end, if desired.

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Steps That UP Product Quality

By going "all-out" with advanced sanitary units, instrument-control techniques, and in-line cleaning facilities, Libby insures quality of products packed at its new Canadian facility

WHEN DEMAND for its products in Canada exceeded capacity of the Chatham, Ontario, plant, Libby, McNeill & Libby management decided to establish an additional facility at Wallaceburg.

Factors involved in the decision were:

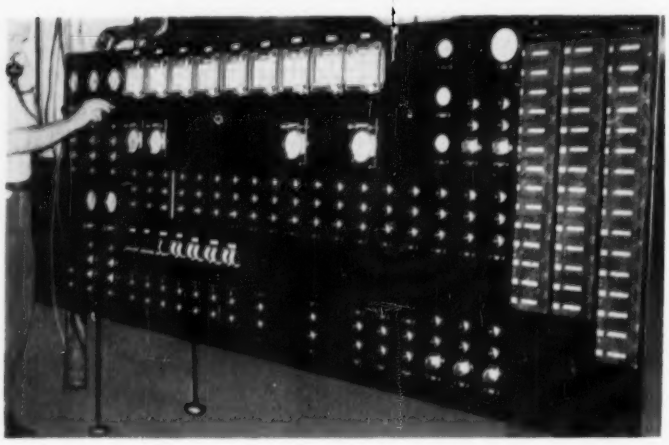
1. Availability of an idle plant used during the war to manufacture tomato pulp for the United Kingdom.

2. An excellent and adequate water supply, including a town-owned treating plant.

3. Kent County soil is fertile and highly productive, and growers are willing to follow recommended cultural practices.

4. Transient labor which is used in early spring on sugar beets, and in late fall to harvest leaf tobacco, was available for planting, harvesting, and processing vegetables.

5. Both rail and water transportation were available.



FROM THIS centrally located instrument panel, quality-control operator sees to it that there's no delay in flow of products from receiving dock to filling machines. Phone is used to rapidly communicate with key personnel.

Multi-Product Facility

The plant was set up to process vegetables in season, starting with peas around June 15 and then, in succession, red beets, lima beans, corn, pumpkins, and mixed vegetables, finishing about the middle of Dec.

This would enable the Chatham plant to concentrate on tomato products (juice, catsup, chili sauce and whole tomatoes) and development of new items.

Plant is a 2-story, 80,000 sq. ft. structure designed for straight line production. And there's plenty of room for expansion on the 65-acre site.

Quality separators, inspection tables, flumes, water chillers, and brine make-up for separators and fillers are on the 2nd floor. Remaining equipment is on the first floor.

Fresh water, which is in-plant chlorinated (Wallace & Tiernan unit), is introduced at inspection tables and pumped backward through dewatering reels to preceding operations, finally being discharged into the sewer.

Advances Pinpointed

In equipping the plant, Libby availed itself of every possible advance that would contribute to operating efficiencies and improvement of quality. Among these were:

1. A main control panel (Taylor Inst. Cos.) which is installed between blanchers and fillers on the first floor.

Panel was specifically designed to provide the qc. operator with greater flexibility in control of operations from feed elevator on receiving dock to filling machines.

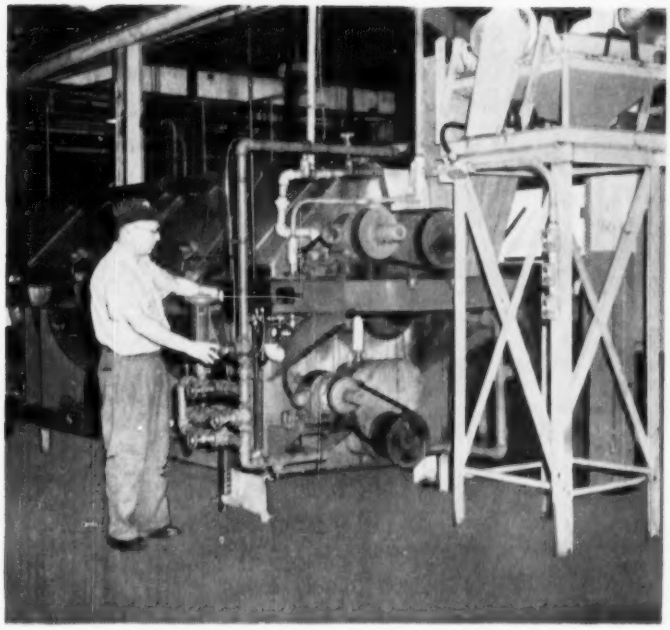
To aid him in these functions, indicator lights (red, amber, and green) designate elevator conditions. Further, pushbuttons enable starting and stopping them. And dial knobs permit adjusting speeds of the elevators.

Similarly, he can control feed of products going into hoppers of the four canning and two carton-filling lines (latter for frozen packs). These hoppers are equipped with high- and low-level indicators that are hooked to lights on the panel. Also, red and green lights show whether or not the two wrapping and four can-closing machines are operating.

To further assist the operator, a dial phone on the panel allows him to communicate with key personnel are various stations in the processing line.

Mounted on the same panel are five temperature recorder-controllers for the pea blanchers, one for the beet blancher, and two for corn blenders. Set-up is completed by totalizers (44) for each of the 14 double corn huskers and 16 corn cutters, and indicater lights for the two corn-blending hoppers, three pumpkin tanks, and three cream-style corn pumps.

2. A second panel is placed on wall of the 2nd floor. Here, another operator adjusts flow of products from separators and inspection tables to filler hoppers in accordance with



NEW SANITARY BLANCHER employs controlled temperature recirculated water to propel product and increase rate of heat transfer.

signals (dispatched from high- and low-level indicators in each hopper) flashed on the board.

3. A third panel (Minneapolis-Honeywell), also on the 2nd floor, which automatically controls density of brine in the gravity separators. The instrument's sampling tubes (inside separators) continuously check brine density, then controller opens and closes diaphragm valves feeding water, or brine from 1,000-gal. make-up tank.

4. New FMC Sani-Flow blanchers that incorporate easy to clean features and a unique operating principle. Unit consists of a round-bottom shell and hood combination housing a perforated spiral screw.

How Blanchers Function

In operation, product is gently conveyed through the machine by recirculating water, which eliminates crushing or tumbling action. The variable-speed spiral, is essentially a timing device, providing positive control of product flow rate and discharge. Close tolerance between screw and shell walls prevents product channeling.

Constant water temperature is maintained by means of thermostatically controlled steam jets in the blancher and return tube.

Easy access for cleaning, maintenance and inspection of machine's interior is through large, hinged doors on either side of the hood. From here, the screw and every interior point are accessible for hosing down.

Built-In QC

On the quality control front, the company left nothing to chance. For the most part, facilities were built in the lines to abolish product-quality variations beyond the operators' control.

Where convenient, flume systems are installed to convey products. And where products must be raised from one operation to another, hydraulic elevators are used. This eliminates need for long conveyor belts that require cleaning. In addition, these systems handle products more gently, remove dirt from them, and the chlorinated water used reduces spoilage organisms.

Froth flotation of peas going into frozen packs was adopted as an additional qc. measure, as well as to step up efficiency of hand-sorting on inspection tables.

The Key grader used for this operation, which follows conventional dry and wet-cleaning steps, mixes the peas with an oil-water and detergent emulsion to separate them from foreign matter. Peas sink to the bottom of a cone-shaped tank and are discharged to a dewatering reel. The froth-trapped extraneous matter is discharged from the top to another reel. Emulsion from both reels is returned to the grader.

Another separating system involves 25 vibrating screens spotted throughout the lines to remove traces of extraneous matter from the products. These are placed as follows: Two ahead of the Sani-Flow blanchers, five at their discharge ends, five before the quality graders, seven at feed ends of the inspection belts, and six above the can and package filling machines.

YOU'LL FIND a diagrammatic presentation of this new facility in this month's foldout flowsheet, "Canning and Freezing—For Quality," on p. 126-129.

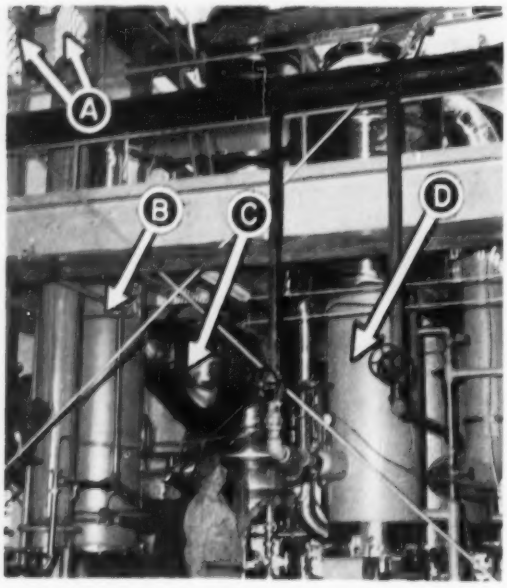
There are also 13 dewatering reels through which the water from the various vibrating screens passes to remove debris before it is returned to the conveying system.

To reduce temperature of that part of the pack destined for freezing, water used to flume it from inspection tables to fillers is cooled to 37-40F.

Employed for this purpose are two chillers—one refrigerated with Freon, the other with ammonia. As an extra precaution, the water is chlorinated directly ahead of the flumes with a simple hypochlorite, table-type dispenser.—*FE Staff*

Concentrating

Midwest juice processor employs new flavor stripping technique for simultaneous recovery of esters and removal of water. Resulting products improve starting materials for jams, jellies, wine



CONCENTRATOR handles 4,000 gal./hr. of juice. Shown are pre-heaters (A), flash evaporator (B), separating chamber (C), and double-effect evaporators (D).

LOSS OF VOLATILE FLAVOR elements in processing has long troubled many types of food processors—from jam makers to coffee roasters. So it is significant that something is being done about it at A. F. Murch Co., Paw Paw, Mich.

This firm is concentrating juice and recovering the flavor esters. And when jams and jellies are made from the reconstituted juice, the full flavor of the original juice can be imparted by adding the esters.

Better wine can be made, too, by using the esters. But these must be added in the same amount recovered in concentrating the juice to comply with provisions of the alcohol tax law. It is a violation to add esters of one fruit variety to another.

But there's more in the Murch operation than means of improving quality. Shipping and storage costs are cut through reduction in weight and volume of raw material. And there are benefits to the processor of concentrates.

The manufacture of concentrates, in contrast to single-strength juice, requires no refrigerated storage. Storing juice to settle out the tartrates and other insolubles takes about two months, with storage facilities then remaining idle for the rest of the year. And cost of refrigeration runs high—about 40c. per gal. of single-strength juice. What's more, fruit-juice flavors are gradually lost during storage.

Processing at the time of pressing is also continuous—with no time lost for storing—and more esters are recovered than if juice were held in storage.

These are the reasons why A. F. Murch Co., Paw Paw, Mich., has just installed one of the most advanced facilities for pressing, clarifying and concentrating grape, apple and crabapple juices.

Key to operations is a tall fractionating column (Mojonnier) which draws off the clear liquid esters under vacuum. With esters removed, the next step is to concentrate the juice in vacuum pans (three to five times single-strength for grape, five times for apple and crabapple).

Other new equipment installed to step up efficiency and improve quality of concentrates are five pneumatically-operated Willmes presses of German make, and a high-speed, self-cleaning Titan centrifuge (Pfaudler Co.).

PNEUMATICALLY-OPERATED presses are self-cleaning, take less floor space than old hydraulic units, produce juice with much less sediment.

A. F. MURCH and JOHN V. ZIEMBA

Respectively, Secretary-Treasurer, A. F. Murch Co., and Associate Editor, "Food Engineering"

Advances Bring Superior Flavors

Presses handle 20 tons of grapes hourly, compared with the 15-ton capacity of eight formerly used hydraulic presses. In addition, the new presses remove more insoluble solids from the juice.

The new centrifuge takes out the last traces of sediment. And, instead of vat-storing the juice for about two months to settle out the sediment (as was previously the case) it is piped directly to fractionating column and concentrator. Thus, Murch is able to process 96,000 gal. of juice every 24 hr. It figures it will handle 15,000 tons of grapes during pressing season.

Extracting the Juice

Starting with incoming grapes from nearby vineyards, the 35 lb. boxes are unloaded onto a rubber-belt conveyor (14 in x 10 ft.), with a Reeves variable-speed drive controlling feeds between 10 to 20 tons per hour. Then, from a 10-ft. roller conveyor, the grapes are dumped into a wash tank (4x4x10 ft.), equipped with a series of water sprays. Empty boxes are transferred to a rubber-belt that carries them back to the trucks.

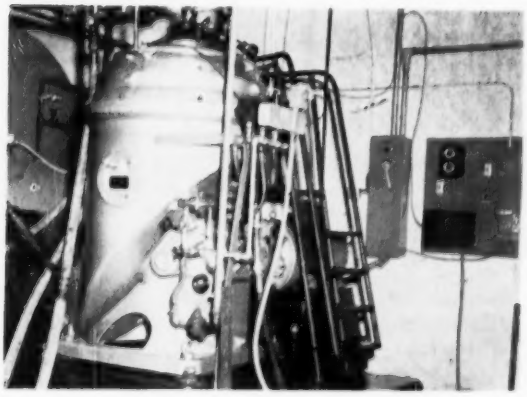
An inclined, wire-mesh belt drains grapes as they are conveyed from the wash tank to a 4x8 ft. Link-Belt vibrator, which completes the dewatering. Then they move past a permanently mounted magnet (Eriez), and discharge into a stainless steel hopper tank feeding a crusher-stemmer (Valley Foundry).

This unit consists of a counter-rotating perforated cylinder with a series of paddles mounted on a horizontal shaft within the drum. Grapes are continuously stemmed and crushed by impact. Crushed fruit drops through holes in the cylinder and into a sump, while stems are kicked out of open end and onto a drag-chain conveyor that carries them out of plant for disposal.

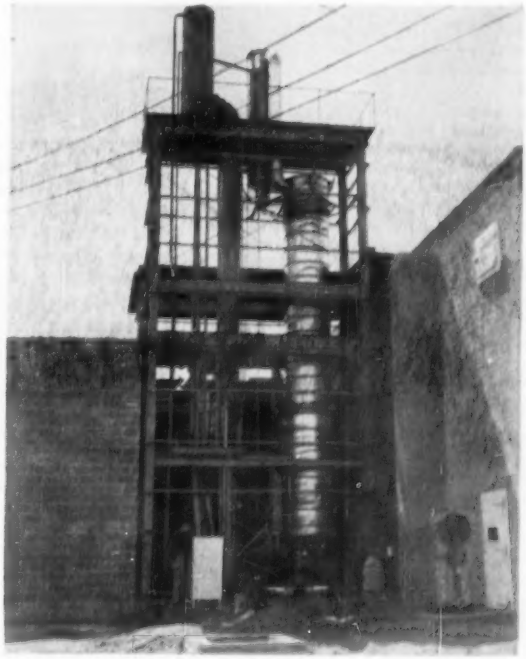
Crushed grapes flow through 4-in. stainless steel pipes to a 500-gal., basement-located stainless surge tank. Here level controls stop motors driving conveyors feeding grapes into plant and out of wash tank when the surge tank is full and start them when it is nearly empty. They likewise control motors operating a pair of 7½-hp. Moyno pumps, which deliver crushed grapes through the pasteurizer and into roof-located surge and slurry tanks, automatically kicking them off when basement tank is low and starting them up when it is full. Controls comprise a pair of ½-in. dia. stainless electrodes, one 14 and the other 24 in. from the bottom of the 2½-ft. deep tank.

In the pasteurizer, grape pulp is pre-heated to about 140F. to help extract color and sugar from skins during subsequent pressing. Pulp then proceeds through a 2-in. stainless steel pipe to a 300-gal. stainless surge tank with a cone-shaped bottom.

This tank, which is located on roof of plant, supplies a divided 1,000-gal. vat. Each section is fitted with a vertical, propeller-type agitator for alternate preparation of pectinol and cellulose pulp and feeding the five



HIGH-SPEED centrifuge removes last traces of insoluble matter from juice. Unit is self-cleaning, and it operates entire season.



THIS 35-FT. HIGH FRACTIONATING COLUMN recovers the flavor essences, which are then bottled for use in fortifying jams and jellies.

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presses. This vat is also equipped with high- and low-level controls to automatically start and stop the crusher-stemmer.

The self-cleaning, easy-to-operate presses handle 20 tons hourly, and yield a high-quality juice. The former eight hydraulic presses took 15 men to handle 15 tons hourly. New presses require only one man to operate each one. What's more, they take less space (30x45 ft. instead of 30x120 ft.), and eliminates need for machine-washing of press cloths and racks.

Proper manipulation renders pomace so friable that it completely drops out of press. Only normal washing and light bleaching of press cloths are needed when switching from red to white pomace. And both types of pomace are pressed with equal ease.

Pressing and Centrifuging

Each press consists of a perforated, stainless steel cylinder with solid cast ends. Cylinder is reinforced with circular ribs, and contains a heavy, inner rubber tube (1½x10 ft.) secured to both ends.

Pressing is accomplished by inflating the rubber tube to 8 psi. to squeeze pomace against cylinder wall. While there's still a flow of juice, tube is deflated and cylinder rotated 90 deg. then inflated again. Cycle is repeated until there's no longer any free-run juice. Then pressure is increased in steps to a maximum of 80 psi.

Upon completion of pressing, tube is deflated and cylinder doors are removed. Juice pan is shifted and a screw conveyor moved into position under the press. Drum is now rotated to the open position, allowing pomace to drop into screw conveyor that carries it out of the plant.

Meanwhile, juice is screened by 2x4-ft. Link-Belt vibrator, and flows into a 1,000-gal. stainless steel holding tank in the basement.

It is again strained by a 40-mesh screen, and pumped to centrifuge supply tanks on the first floor. From here it is metered at 4,000 gal. per hr. to the 5,600-rpm. centrifuge. This unit operates on a time cycle—15 min. to remove last traces of sediment and 20 sec. for desludging. Sludge is collected and returned, with sediment from the supply tanks to the presses for further juice recovery.

Juice (16 Brix) from the centrifuge is pumped (4,000 gph.) through a pair of 1½ x 20 ft. tubular preheater using steam at 60 psi. to heat it to 220 F.

Next, juice enters flash-evaporator (another tubular unit, 2½ x 10 ft. operating under 9 psi. steam pressure) that discharges to a specially designed centrifugal-type chamber which separates concentrated juice from ester-containing vapors. Latter proceed to the 4 x 35 ft. fractionating column while juice goes to double-effect evaporator.

Vapors enter fractionating column about ¼-way from bottom and proceed upward through a 16-ft. bed of 1-in. porcelain saddles that strip essence from them. Flow is countercurrent to condensed vapor (with residual esters) being returned from water-chilled tubular-type condenser (2½ x 10 ft.) alongside top of fractionating column. "Bottoms" pass through the saddles to a tubular-type reboiler, operating under a steam pressure of about 10 psi. Trace esters recovered this way proceed upward through the column, along with fresh vapors from separating column.

Esters recovered in the column represent 1/150th the volume of original juice. They are discharged to a water-chilled, tubular-type vertical cooler (1 x 10 ft.) where temperature is reduced from about 130 to 35 F. then collected in 5-gal. containers.

From separating chamber, juice (24 Brix) passes to a 600-gal. balance tank that feeds 1st-effect of evaporator. Here, under a 20 in. vacuum, juice is concentrated to 30 Brix, then goes to the 2nd-effect (operating under 28 in. vacuum) where it is concentrated to 45 Brix, a 1 to 3 product. Concentrate is cooled from 110 to 70F. in a tubular-type heat exchanger, then goes to three ammonia-jacketed stainless steel tanks. Following standardization, product is pumped to six 52,000-gal. cold-storage (30F.) tanks, from which concentrate is filled into polyethylene-line metal drums holding 55 gal.—*End*

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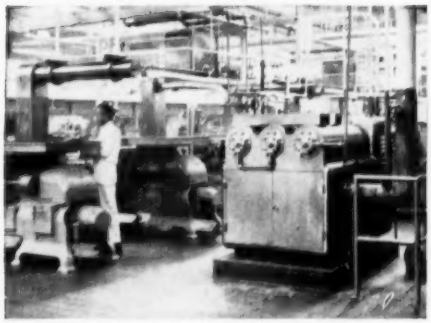

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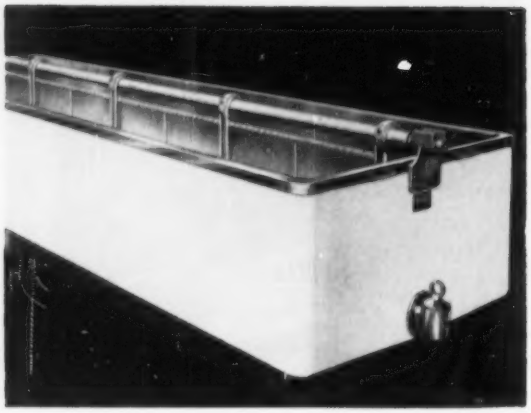
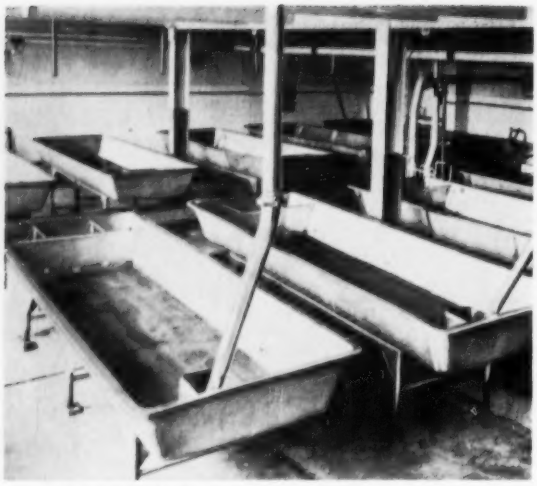
Advanced Equipment



1 VATS have square ends and pendulum-type paddle sweeps for mixing. For cutting curd wire frames (seen in photo) are attached to center bar and stirring paddles.



2 CURD SINKS have surge housings at one end, perforated plates, through which whey passes, at other. Their use saves 2-hr. per vat.

British Robotize Cheesemaking

With new units and streamlined procedures, labor is reduced, processing time shortened, manual chores made easier

UNLIKE THE U.S., where very few labor-saving devices have been introduced in cheddar cheese manufacturing, England and Scotland have now highly mechanized their factories.

As a result, they have: (1) Reduced labor cost; (2) shortened processing times; and (3) improved employee morale due to easing of the cheesemaking chores.

Line-flow is an accepted feature. Milk is set with rennet and lactic-acid cultures in large square-end vats, and the curd is cut with special knives.

Cooked curds and whey are then transferred to special sinks where pressing under the warm whey and/or cheddaring takes place. Cheddared blocks are conveyed to milling machines and the curds are salted, cooled, and hooped automatically.

English cheddar generally displays one distinguishing difference from its American counterpart. Initial titratable acidity is higher, being about 0.80% or more when the cheese is placed in the press. This is because English cheese matures longer and must be kept in good condition for about 12 months. However, its acidity difference has no significant effects on the principles of cheesemaking.

F. V. KOSIKOWSKI

Professor of Dairy Industry, Cornell University, Ithaca, N. Y.

BRITISH TECHNIQUE DETAILED

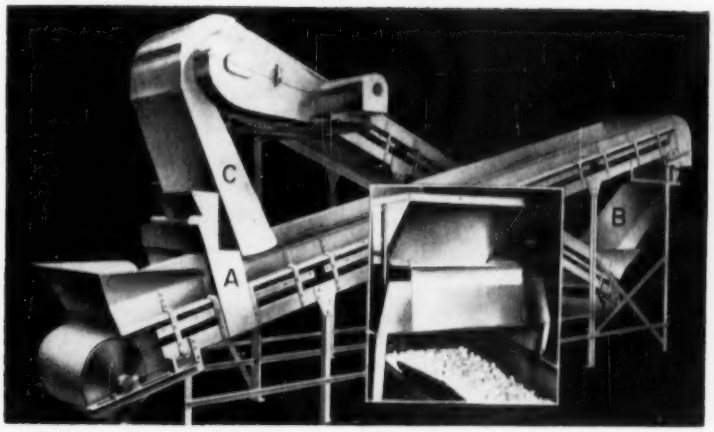
Salient features of the mechanized British process are:

Setting Milk: Milk is pumped into square-end stainless 1,000-gal. vats. Sufficient starter culture, approximately 1% is added followed by incorporation of 36 oz. of rennet at 88F. Stirring during this process is done with a motor-driven, pendulum-type paddle sweep. Unlike those in American factories, these paddles are attached to a cylindrical bar seated at the ends of the vat and running longitudinally up the middle —see (1) on accompanying drawing, also Photo 1.

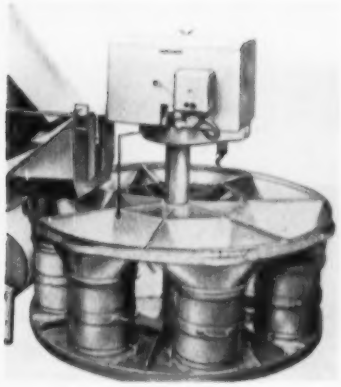
Cutting the Curd: While the milk is still fluid, wire cutting frames are attached to the center bar and stirrer paddles, so that they are in position for cutting when needed. In practice the curd, which takes 20 to 30 min. to form, is first cut across the length of the vat by vertical knives. This is followed by the swinging-knife action of the heavy wire frames. Cross-section cuts of the curd strips occur when they slip between the end of the cutting frames and the vat sides. Then the cutting frames are removed and transferred to another vat.

Cooking: The curds are cooked slowly to about 102-104F. by steam not under pressure. Agitation during cooking is accomplished by the moving paddles.

Fluid Removal: When nearly cooked, curds settle in the bottom of the vat. Then a considerable portion of overlying free whey is slowly removed. At the proper moment the remaining whey is stirred with the cooked curds and, as stirring con-

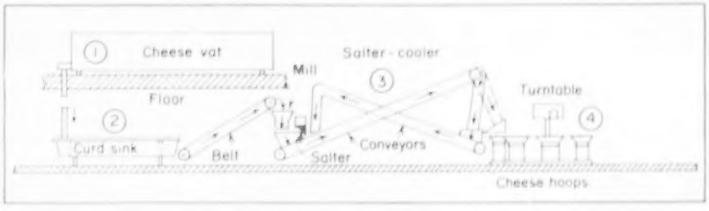


3 **MECHANICAL COOLER** automatically salts, mixes, and cools curds. In operation, milled curds fall through hopper (left) and are moved by belt under electromagnetic salter (A, and inset). When curds reach end of belt (right) they fall through chute (B) onto second belt that elevates and moves them back to front of device. Here, chute (C) returns them to first belt just ahead of salter. When curds are cool, chute (B) is moved to right diverting them to hopper of mold filler.



4 **MOLD FILLER** comprises turntable on which metal hoops are set. As it rotates, hoops are partially filled with curds, then tamped and filled. Two complete turns are required for each hoop. Molds are then transferred to presses for a 24-hr. pressing.

Process



IN MECHANIZED CHEDDAR PROCESS, milk is set and curd cut in vat (1). Then mixture of curds and whey is drawn into special sinks (2) on floor below where whey is removed and the curds cheddared. Following milling, curds are salted, mixed and cooled on special apparatus (3), hooped at (4).

tinues, both are sluiced, into mobile sinks — Point (2), drawing and photo. Mixture is directed into a surge housing at one end of the sink to prevent flooding of curds against a perforated plate at the opposite end. Whey passing through the plate is pumped to storage tanks for separating and condensing.

Forming Characteristic Texture: Alignment of the curds along the floor of the sinks provides a certain amount of pressing under warm whey. If desired, this may be done completely as is commercial practice in Sweden and Norway, by using proper end and top plates and weights. In England, however, the whey is usually removed and the bed of curd subjected to conventional cheddaring.

Milling the Curd: The well-knit cheddared blocks are cut into long strips, then placed on a "sweet rubber" or nylon belt conveyor, and elevated to a milling machine. Here they are reduced to required curd size and dropped onto a 29-ft. long automatic salting and cooling apparatus — Point (3).

Mechanized Salting and Cooling: Milled curds are first conveyed through an electromagnetic type, high-speed vibrator, which delivers salt onto the product at a predetermined rate.

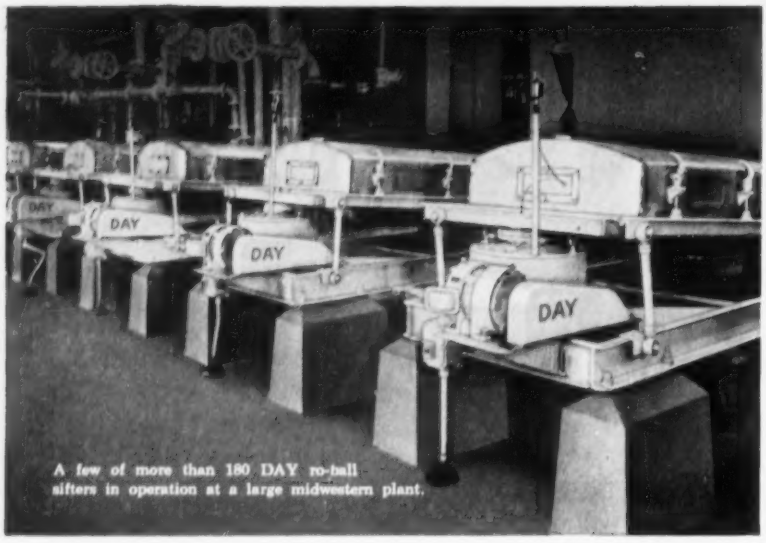
Then they move up a long, inclined rubber belt, and discharge through a chute into a hopper that feeds them to another incline belt. This belt conveys the curds back to the front of the apparatus and discharges them into a hopper just ahead of the salting apparatus. This completes a full cooling cycle. The mechanical cooler contains baffles for mixing the moving curds. It also may be equipped with heating and cooling appliances to allow more rapid cooling or, if necessary, some heating of the curds.

When all the curds from one vat have been salted and have traveled through sufficient cooling cycles, chute at end of first belt is moved to a position that directs product into cheese hoops. If enough vats are available and timed properly, movement of curds from vat to press is continuous.

Hooping and Pressing: From the mechanical salter, curds are emptied into appropriate sized and shaped metal molds brought to proper position automatically by a mechanical turntable — Point (4). This apparatus has a filling capacity of approximately 500 lb. per min. Two complete turns are made to fill individual hoops. Between the turns, curds are mechanically tamped to effect better settlement.

Filled molds are next transferred to large hydraulic or pneumatic gang presses capable of applying up to 8 tons pressure per sq. in. For English cheese, however, 1.5 tons psi. are normally used. Removed from

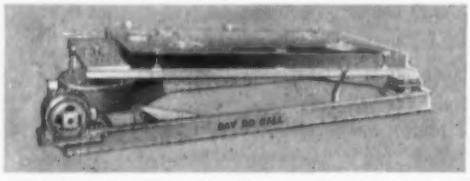
SIFT finer-faster-cleaner with DAY ro-balls



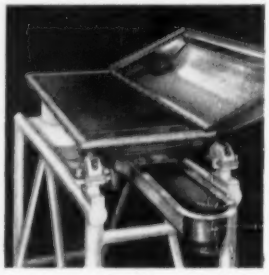
A few of more than 180 DAY ro-ball sifters in operation at a large midwestern plant.

Today thousands of products wet or dry, from flour to wood chips, are sifted through efficient, low-cost, high-production DAY ro-ball sifters. Superbly engineered, built for trouble-free operation under the severest service conditions, they insure longer life with lower maintenance costs.

The exclusive super active ball cleaning device provides rebound points in each ball compartment, assuring fast, thorough sifting of your product. Gyrating action brings material into constant contact with every square inch of screen surface. A stabilizer maintains screen in horizontal position and insures smooth operation.



DAY standard ro-ball, available in six sizes, single or multiple screens. Single screen models in stock.


Stainless steel units available to meet food and dairy sanitary codes.

Many models are available so it is easy to choose one which will exactly suit your requirements. They can be used separately or in combination with DAY mixers or blenders to save product handling. A completely equipped lab is available for testing your product.

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the presses within 24 hr., the cheese is later waxed and ripened.

ADVANTAGES AND DISADVANTAGES

Several distinct time and money-saving benefits are associated with the use of the above described equipment and operation.

The British system requires only 4½ hr. from setting to final pressing. This compares with 5½-6½ hr. by the conventional method.

Curd sinks achieve an additional saving, as their usage releases the cheese vat approximately 2 hr. sooner for each lot of cheese. Also their shallow depth and appropriate height require less physical strain and allow women to do the cheddaring without difficulty.

Because of the heavy initial investment, such a mechanical scheme cannot be too economical in small cheese factories. But for medium-sized and large factories this setup has strong appeal.

Another possible criticism might be due to the manner in which curds are cut. But Scottish makers, who always cut with care, have not found these points critical to efficiency and cheese quality.

Acknowledgment: The author thanks Prof. Tom Murdock, West of Scotland Agricultural College, Auchincreive, Ayr, for discussing many details of mechanized cheese-making in Scotland. Also, N. P. Stoate and V. D. Moore, Dairy Supply Co., Ltd., London, for their helpful suggestions and photos of equipment.

"Who said you're human?"

KEEP YOUR PRODUCT ABOVE THE CROWD

with

FRODEX

CORN SYRUP SOLIDS

CATSUP

Frodex enhances natural color, retards oxidation, particularly in the neck of the bottle, and does not mask the true condiment flavors of the catsup.

CAKES and PIE CRUSTS

Cakes made with Frodex have increased volume, finer grain, smoother texture, prolonged shelf life, better flavor, richer crust color and are produced with a greater yield and at lower cost. Frodex added to pie crusts means better color, faster baking, improved flake, greater stability, crispness and enhanced flavor.

DRY FOOD MIXES

Frodex can be used in soups, icings, cake and pie mixes, drinks, muffins, pancake mixes and similar dry food products. Important advantages are found both in production and in the finished product when Frodex is added to the mix.

MEAT PRODUCTS

Frankfurters Sausages Canned Meats

Frodex minimizes color loss during processing, storage and display. It is an excellent moisture conditioner for longer shelf life, produces better texture, less shrinkage and minimum watering off. Frodex is a better binding agent, produces better appearance, adds stability to high fat-content products as an emulsifying agent, and will not shrink delicate meat and spice flavors.

FROZEN FRUIT

The use of Frodex in freezing fruits and berries results in higher quality at considerable savings. Frodex prevents oxidation and desiccation. It retains the natural color and juice to produce a full, firm fruit with greater natural fruit flavor. Frodex permits quicker freezing and produces a higher drained weight.

ICE CREAM

Specified by a majority of the country's manufacturers for over 20 years, Frodex has important advantages in ice cream and ice cream specialties. Flavor is heightened, texture is smoother, heat shock tolerance increased, total solids content is built up, and melt-down is improved when Frodex is used in ice cream, stick novelties, sherbets, low fat and other specialties and novelties.

Rise to the top with your products—give them longer shelf life, better flavor and improved appearance with FRODEX Corn Syrup Solids. FRODEX boasts an extra proportion of pro-sugars (edible dextrins) and supplies reducing sugars without excessive sweetness. Odorless and tasteless, FRODEX holds and underscores other natural flavors.

Our technical staff is always glad to help with production or formulating problems—call our local representative today without obligation, of course.

AVAILABLE IN 3 FORMS

24 D.E. and 42 D.E. Conversions; 24 D.E. Powdered; 42 D.E. Powdered and Granular

AMERICAN MAIZE-PRODUCTS COMPANY

250 PARK AVENUE • NEW YORK 17, N. Y.

ATLANTA • BOSTON • BROOKLYN • BUFFALO • CHICAGO • DENVER • FORT WORTH • GRAND RAPIDS • LOS ANGELES
MEMPHIS • PHILADELPHIA • PITTSBURGH • PORTLAND • ST. LOUIS • ST. PAUL • SAN FRANCISCO • SEATTLE

Aluminum Foil Packaging As a Material for Printing

Report No. 12 of a Series by Reynolds Metals Company

In addition to its well known protective properties, aluminum foil offers special advantages—and problems—as a surface for printing. The outstanding characteristic is, of course, brightness—or light reflection. Aluminum foil, with a reflectivity of approximately 85% for visible light, possesses exceptional brightness.

This is particularly important in self-service retailing because of the confusing array of similar and competitive products displayed side by side. To sell itself effectively, a package must, first of all, attract attention. It must catch the eye—stand out. Brightness, by itself, can meet this first essential—and help meet the further requirements of attractive modern design and unmistakable product identification.

Developed Transparent Inks

But adding color to this brightness required the development of today's transparent inks. These transmit a large part of the light falling on them and permit reflection from the foil beneath to create rich and glowing effects. Package designers now use transparent inks extensively, often in combination with opaque inks, for sparkling contrast and maximum legibility.

Aluminum foil is completely non-absorptive—nothing can soak through from the inside, or be soaked up on the outside. And the very smoothness of foil means a clean package, as well as greater eye-appeal. Yet these advantages also posed printing problems at the beginning. It was necessary to develop inks that would take hold despite the non-absorptivity—that would permanently grip the smooth surface. This is especially important because of the scuff resistance required in retail handling.

To solve these problems, Reynolds spent years developing inks which have extremely high forces of attraction for the foil surface—and which at the same time maintain the properties of transparency or opacity, drying speed, proper viscosity, etc. Proof of success is the high durability of today's printed foil packages—with adhesion of inks comparable to printing on paper. For extraordinary scuff resistance, a series of clear overprinting lacquers has been developed. Application of one of these over a printed surface provides a combination satisfactory for even the most critical use.

Proving Fade Resistance

Another vital property is resistance to fading from exposure to heat and ultraviolet light. Display brilliance must not be lost. There is now a wide variety of available pigments which will not fade in fadeometer tests exceeding 100 hours.

Finally, it was necessary to solve all of the problems encountered in shifting from the laboratory to the print shop. Twenty five years of practical experience have accomplished this and foil can now be printed as readily as papers or films. Crisp, clean, multicolor reproductions, with delicate tones as well as vivid colors, are achieved in simple or intricate designs—on rotogravure presses—at web speeds exceeding 500 feet per minute. Printed aluminum foil is an established commercial product—assuring high visibility, instant identification and unmatched protection in a single packaging material.

Reynolds has unexcelled facilities for servicing your foil printing requirements—from original design to final printed product. Your local Reynolds representative can place at your disposal an experienced staff of artists and package design engineers to aid you in creating a distinctive new design or in most effectively adapting your present design to foil. Or you may write to **Reynolds Metals Company,** General Sales Office, Louisville 1, Kentucky.

Watch Reynolds All-Family Television Show "DISNEYLAND", ABC-TV.

Modern gravure press turns out brilliant foil wrappers at Reynolds printing plant.

OLD BRUSH-AND-DUMP inefficiencies are relegated to limbo by new common-sense routine. It's all now done team-style, with one man on vac unit (left) and other man on scrubber (right).

Rings up 7 benefits with—

Systematized Floor Cleaning

Simple 2-machine program wins better and more frequent area sanitation for medium-sized company. Labor and cleaning agent saved into the bargain

ACTUALLY, the "spic-and-span-all-day-long" floor needn't be an elusive dream.

You can achieve it by acquiring just a bit of practical know-how and putting it to work in place of old haphazard methods.

At our plant—Fisher Nut Co.—we first concentrated on standardizing an effective system. Then we implemented the resulting routine with high-performance cleaning units.

Specifically, we "laid the groundwork" by installing quarry tile in our newly added 2,500-sq. ft. processing area as well as over the 4,000 sq. ft. of concrete flooring in the old area. This tiling has high resistance to corroding elements, oils, greases, and water. Also, it is easily cleaned.

Then we purchased a portable scrubbing machine and a vacuum cleaner. And we also chose a specially formulated synthetic detergent for cleaning—one particularly effective in cutting floor grease.

In this program, we worked with floor-maintenance men at Multi-Clean Products, Inc. With these specialists, we considered all the angles—type of flooring, soil being removed, cleaning agents, methods.

Out of it all came a very systematic plan of cleaning, which, now that it's been swung into action, is paying off for us in these seven notable ways—

1. **It quadruples our cleaning performance.** For our two-man crew cleans the present 6,500 sq. ft. of plant flooring in 3 hr., whereas it used to take these men 8 hr. for our old 4,000 sq. ft. layout. Figurewise, this is 1,083 sq. ft./man-hour against the former 250.

Result is much improved cleaning, since the new system enables more frequent coverage. Now all process areas are covered every night and the warehouse once a week (one of five sections of the latter each night).

2. **Markedly reduces maintenance.** Repairing and resurfacing have been cut to a minimum.

3. **Saves on cleaning agent.** The new scrubbing-vacuuming technique takes only 1¼ to 2 gal. solution, whereas the old mopping required 8 to 10.

4. **Cleans better.** For with both fats and oils, as well as dirt, completely picked up, the floors are much neater.

5. **Increases safety.** Because the crew no longer works on wet, slippery floors.

6. **Betters product production.** Because the evening shift is no longer handicapped, as formerly, by the long cleaning operations.

7. **Improves morale.** Workers have reacted very favorably to the cleaner, safer floors.

The permanently lubricated finger-tip-control floor scrubber includes a 3-gal. solution tank and channel-feed brush. A 1½-hp. motor rotates the 22-in. spread brush at 175 rpm.

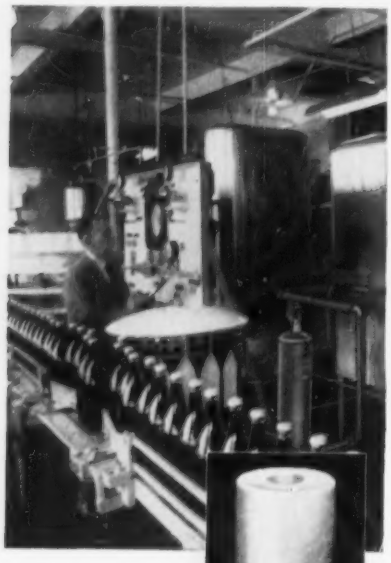
The heavy-duty vacuum cleaner, with 16-gal. tank, is driven by a 1-hp. motor and has a 3-stage turbine that moves air at high velocity for powerful suction pickup. This motor has an independent by-pass air-cooling system that safeguards it from dirt and dust contamination.

Detergent employed serves to temporarily suspend floor oils in solution. Thus they are immediately picked up by the cleaner. —*End*

B. R. ARONSON

Factory Manager, Fisher Nut Co., St. Paul, Minn.

FILTERING WATER for carbonated beverages...



FIRST NATIONAL switches to

CUNO

MICRO-KLEAN FILTERS

"... Filter changes reduced more than 500%"

"... and, in addition, we're sure of a sparkling clear beverage." This statement by the Assistant Superintendent of the Beverage Bottling Department sums up the benefits that the new, white cellulose Cuno Micro-Klean Filter Cartridge brought to the First National Stores' East Hartford, Connecticut plant. If *your* filtration requirements include purity, clarity and complete freedom from any filter-imparted taste, Micro-Klean can bring similar important benefits to your food-processing operations.

WRITE NOW FOR COMPLETE INFORMATION . . . ask for your free copy of Catalog No. 53-100.

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Filtration Engineers in Principal Cities

MANUFACTURING

Better Peanut Butter *Ultrasonically*

Wave treatment of finely ground nuts in a continuous stream results in creamier 'butter'—more stable, tastier than conventional product

WHEN CONSUMER ACCEPTANCE of a food product is high, as indicated by a steady increase in sales, the product's quality is usually responsible.

And this is the case with Nabob Foods (Vancouver, B. C.) Squirrel brand peanut butter, which has set the highest standard for flavor, texture, and shelf life of any peanut butter in its market area.

The company selects only the highest quality peanuts to be roasted and ground. Grinding temperature is carefully maintained at 160F., and particle size is so reduced that at least 95% of the product will pass through 200 mesh screens.

At the grinding stage a plastic-type hydrogenated peanut oil is added under positive pressure to insure incorporation of the desired amount of this stabilizer. Quantity of stabilizer is kept as low as possible (slightly less than 2%). But it is felt this quantity is ample to provide shelf stability, with the necessary retarding of oil separation.

But it's the next step in the process—ultrasonic homogenization—that makes Squirrel brand creamier, more stable, and smoother than competing peanut butters.

Employed for this operation is the special Rapisonic for peanut butter (Sonic Engineering Corp., Stamford, Conn.).

The unit is very simple, comprising a 3-hp. motor with a Rapisonic head. It is connected directly to the discharge outlet of the grinder. The peanut butter impinges, in the form of a flat, high-pressure jet stream, on the edge of a stainless steel blade which vibrates at its natural frequency of about 22,000 cycles/sec.

Cavitation takes place continuously in the stream as it rushes past the blade, causing violent pressure changes to be generated locally. Vibrating element and jet-form are enclosed in a resonant bell which concentrates the vibrations and insures that the velocity of the jet across the blade is maintained. Thus the forces are immediately put to work with virtually no loss of energy.

Following homogenization, the product is bottled, labeled, cased and sent to the warehouse ready for shipment.

Due to the excellent homogenization that takes place, the resulting product is very smooth with a shelf life approximately 150-200% over the previous product. Stabilizer is evenly distributed throughout the mass.

The ultrasonic process allows use of a lesser amount of stabilizer than would normally be required to produce desired shelf life. This, in turn, gives the product a truer peanut flavor.

Unit has a capacity of 350 gal. per hr. It is given normal maintenance, including replacement of the vibrating blade after about 200,000 to 300,000 lb. of peanut butter has been produced. This has been found necessary as a slight wearing takes place due to the abrasive action of the peanut butter. —*End*

RUDI RUPP and J. P. BAIRD JONES

Respectively, chemist, Nabob Foods, Vancouver, and technical sales agent, Atlas Powder Co., Canada, Ltd., Brantford, Canada.

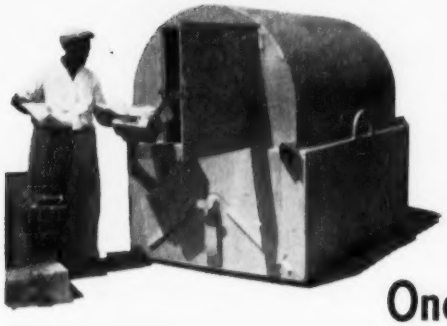
Stokely Van Camp

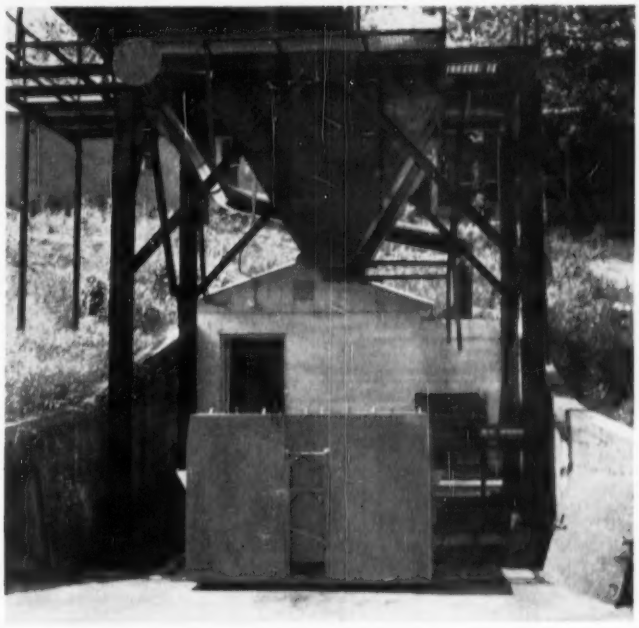
"CONTAINERIZES" Waste as It Accumulates

Newport, Tenn. Plant "Containerizes" Waste and Rubbish at 15 Accumulation Points . . . One-Man, One-Truck Dempster-Dumpster Handles All Collection and Disposal of Materials!

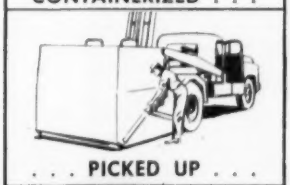
Container at right receives vegetable wastes from washer bins.

Container below is one of several used to collect rubbish.

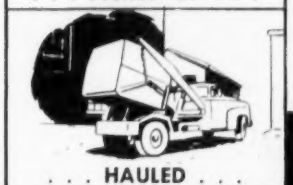




WASTE IS CONTAINERIZED . . .



. . . PICKED UP . . .



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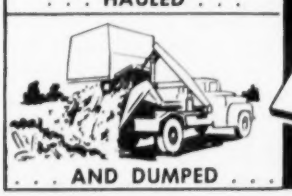


. . . AND DUMPED . . .

One-Man Dempster-Dumpster System Serves Many Food Processing Plants

Keeping a food processing plant clean and free of fast-accumulating waste is a critical job . . . one that can't be economically handled by wheelbarrows, cans, bins or carts. Eliminate manual shoveling and rehandling as other industry leaders do by *"Containerizing"* waste, when and where it originates. The secret lies in clean, big-capacity Dempster-Dumpster containers at principal points of waste accumulation, periodically picked-up, hauled and emptied by one man and one truck-mounted Dempster-Dumpster.

The savings are obvious . . . food plants customarily amortizing their Dempster-Dumpster equipment investment in 18 months or less. If you're now using costly, obsolete methods of waste disposal, it will pay you to write for the booklet below.

FREE: Write Today for Your Copy of "How to Reduce Waste Disposal Costs"

DEMPSTER BROTHERS, Knoxville 17, Tenn., Dept. FE-12

THE DEMPSTER DUMPSTER® SYSTEM

To: Dempster Brothers, Dept FE-12
Knoxville, Tennessee

Please Send Without Obligation Your Booklet, "How to Reduce Waste Disposal Costs."

NAME TITLE

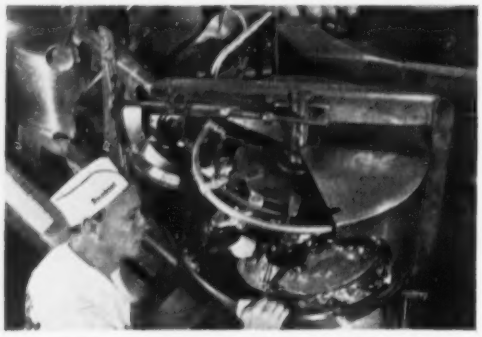
COMPANY

ADDRESS

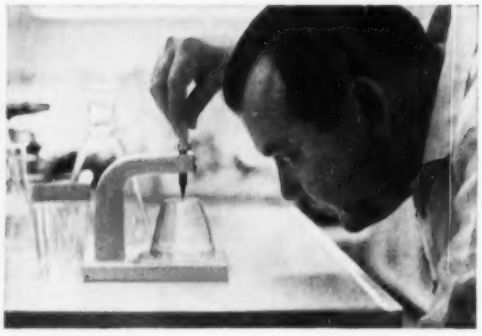
CITY STATE

One look at the huge, sprawling buildings at one of the Exchange Products plants and you know that big things are happening inside. For here *citrus* is king. Trucks pour in with fresh fruit from groves all over California and Arizona. Conveyer belts hum along in every direction. And Exchange products are shipped to nearly every part of the world.

Why 'Exchange' products serve you better



Utmost cleanliness is the watchword at Exchange Products plants. Everything has that "just washed-down" look. Every four hours, extraction equipment is completely cleaned. Every third day, the entire plant closes down for a thorough washing.



Exchange quality is assured by constant checking in extensive testing laboratories. In fact, rigid quality controls have been set up *throughout* the plant to make sure that every product measures up to Exchange quality. Sunkist produces more than 400 different citrus products.

The world's largest citrus research department is maintained by the Sunkist Growers to develop new growing methods, to improve manufacturing processes, and to perfect better products. Today, with a backlog of more than 60 years experience, Sunkist has accounted for 118 separate U.S. patents.

Just three of many Exchange products are *Exchange Preserver's Pectin*—guarantees a more uniform finished product; *Exchange Low Methoxyl Pectin*—jells *without* sugar, tasteless, controls "weeping" in pies; *Exchange Lemon Juice*—brings out natural flavor of *any* food. Superior acidulant, excellent anti-oxidant.

Sunkist Growers

PRODUCTS DEPARTMENT • ONTARIO, CALIFORNIA

Distributors for

Exchange Lemon Products Co., Corona, Calif. • Exchange Orange Products Co., Ontario, Calif.

Components of Smoke

Friction smoke is richer in desirable components than that produced by burning sawdust.

This was among the findings resulting from studies of condensate of smokes made by the two methods. Steam distillates of the concentrates were found to contain most of the smoke odor and flavor, while the non-steam volatile portions retained most of the dark color. These portions were found very undesirable for smoking bacon.

Friction smoke contained less moisture than sawdust smoke. It also had 4 times more steam-volatile acids, 8 times more aldehydes and ketones, and a greater amount of phenolic compounds.—*Food Technology*, 499-502, Oct. 1957.

Cartons for Apple Storage

Vented cartons with perforated trays allow apples to cool in half the time required for unventilated containers, and perform equally with standard wooden boxes.

Most satisfactory vents sizes are ¾x2-in., with two in each end of carton (one at upper, one at lower level). In addition, stacking must allow surface exposure equal to area of 2 ends, with vents in these surfaces.—*Agricultural Marketing*, 6, Oct. 1957.

Biologically Stabilized Beer

L. pastorianus, the lactic acid rod, is easily killed in bottled beer by pasteurization at 130 F. for 30 sec. Yeasts can be inhibited by concentrations of 4 mcgm. of Trychomycin, 5 mcgm. of Eurocidin, or 25 mcgm. of Vitamin K-3 per ml. Trichomycin is preferred. The other agents impart objectionable bitterness to the beer.

L. pastorianus is inhibited by either 6.25 mcgm. of Polymyxin B, or 4 mcgm. of Penicillin G (sodium salt) per ml. By addition of 4 mcgm. of Trychomycin and 4 mcgm of Penicillin G per ml. of beer, unpasteurized bottled beer is stabilized biologically for three weeks.—*Bul. Brewing Sc.* Vol. 3, 52-63, 1957 (In Japanese).

Stable Sweetened Cream Products

Sugar-preserved cream that keeps well without refrigeration, just as do sweetened condensed and evaporated milks, is a promising new product developed by USDA.

It contains about 30% sugar, 10% nonfat milk solids, 20% water, and 40% butterfat.

Its manufacture comprises the following steps: (1) Preparation of high fat content cream; (2) addition of NFMS to increase stability of the emulsion; (3) addition of sugar to preserve the product; (4) heating to 200F; (5) cooling by product-to-product regeneration; (6) discharging into a vacuum chamber to remove air, and (7) packaging in friction-top metal containers with minimum reincorporation of air.

At 50-60F. product has been held for 6 months without appreciable fat separation or darkening. At 80F. these defects developed. Suggested uses in addition to ice cream manufacture, are dilution with milk to make cereal or coffee creams, as an easy-to-use butterfat for baking.—*Paper presented at IAICM meeting, Oct. 25, San Francisco.*

Rheological Properties Of Dark Chocolates

Factors influencing viscosity of chocolate are:

Conching at low moisture (below 0.3%) increases viscosity in lecithin-free chocolate. At medium moistures (about 0.6%) very little change occurs, while at high moistures (above 1.3%) the viscosity decreases. In presence of lecithin viscosity is lowered very little even by conching for 70 hr.

In pre-conched chocolates, and in those losing moisture during conching, a minimum in the viscosity-moisture curves always occurred.

Fat has a very great effect on viscosity, much more than degree of refining, so that excess refining, beyond that necessary for goods being made, is to be avoided. Addition of lecithin decreases viscosity faster than increase of fat alone, hence the addition of 0.3% lecithin means a saving in fat. At high fat levels, (above about 34%) lecithin does not effect a saving in fat.

Storage of lecithin - containing chocolates for 3 or 4 months, increased their viscosities, the effect increasing with decreasing fat content, and its magnitude depending on the type of conche. Chocolate without lecithin additions did not show the viscosity increase.

Decreasing temperatures from 100F., (standard for viscosity measurements) to 87.8F. increased viscosity of a 35-15% fat chocolate, conched 66 hr. at 160F., by about 37%. An unconched chocolate increased 35% over the same temperature range. Seeding with small fat crystals also increased the viscosity.—*International Chocolate Review*, XII (8), 302-316; (9), 350-362, 1957.

Calculating Filtration Velocity Of Diatomaceous Earths

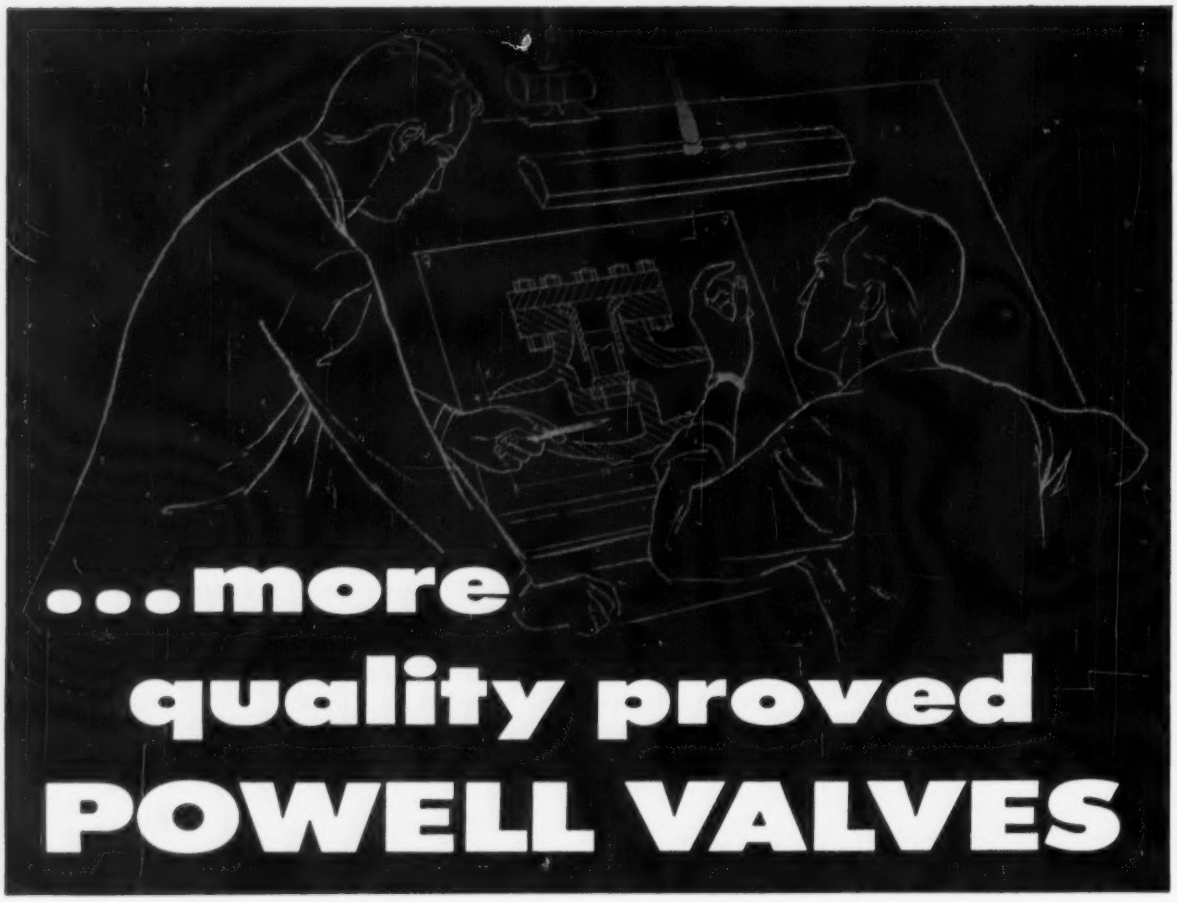
Comparative flow rates of diatomaceous earth filter aids can be estimated by use of a closed tank under constant pressure that forces water through a vertical filter disk coated with the earth.

By timing flow of successive 200 ml. portions of water through the earth coated disk (0.2 lb./sq. ft.), and calculating the flow in liters/m.²/min., a convenient constant is obtained. Grade of earth, temperature, and liquid velocity each have a pronounced effect. Temperature and viscosity effects are greater for the finer grades of filter aid than for the coarser ones.—*Brauwissenschaft* 10 (5), 114-20, 1957.

Puff-Drying of Whole Milk Improves Dispersibility

A dried whole milk of excellent fresh flavor and rapid dispersibility in cold water has been made in a vacuum shelf dryer, using special foam-drying techniques.

In its preparation, fresh pasteur-



...more quality proved POWELL VALVES

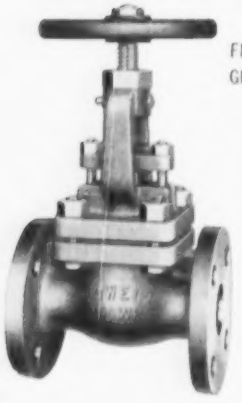
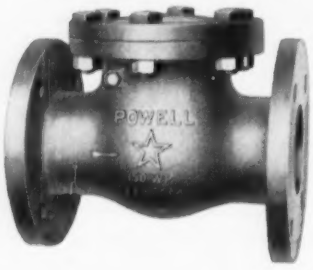


FIG. 2475—Stainless Steel O.S. & Y. Globe Valve for 150 Pounds W.P.

FIG. 2309 SW—150-Pound Flush Bottom Tank Valve with Powell Patented Seat Wiper.

FIG. 2456 SG—Large Stainless Steel Gate Valve for 150 Pounds W. P. Flanges conform to latest Standards.

FIG. 2433 SS—Large Stainless Steel Swing Check Valve for 150 Pounds W.P.



Designed for long life, designed for dependable service

Consult your Powell Valve distributor for all the facts about quality proved bronze, iron, steel and corrosion-resistant valves. No matter what the flow control problem, a Powell Valve can solve it . . . *better.*

THE WM. POWELL COMPANY, CINCINNATI 22, OHIO . . . 111th YEAR

ized, homogenized milk is concentrated to 47-50% total solids at a temperature of 85-100F. in a high vacuum, falling-film evaporator. Concentrate is heated to 135F. and nitrogen bubbled through it from a sparge line to disperse the entrained gas. This is followed immediately by 2-stage homogenization, at 4,000 psi. and 500 psi., respectively.

Concentrate is then flowed over stainless steel drying pans to an average depth of 1/16th in., chilled to 55F. or below, and dried as a foam in a vacuum shelf dryer. Dried mass is crushed lightly through stainless screens.

Tests indicate that product passed through a 20-mesh screen has greater dispersibility than that put through a 40-mesh. There was little difference between material that had expanded from 32- to 72-fold during drying, but expansion below 32 reduced dispersibility considerably.—*J. of Dairy Science*, 1036-45, Sept. 1957.

Lactic Starter Metabolism

The preheating history of milk has a marked influence on activity of starters propagated in that milk.

In general, reconstituted high-heat powders (preheated to 175F. for 30 min.) support starter activity better than low-heat powders (preheated to 145F. for 30 min.). However, excessive preheating exerts a deleterious effect, on the reconstituted milk.

In the case of fluid milks, a primary zone of stimulation exists between 148F. for 30 min. and 162F. for 40 min. This is followed by a zone of inhibition between 162F. for 45 min. and 180F. for 10-120 min., or 195F. for 1-45 min. A second zone of stimulation exists between 195F. for 60-180 min. and 250F. for 15-30 min. Final inhibition occurs with heating at 250F. for more than 30 min. In raw and low-heat milks cysteine is stimulatory. With high heated milks it was inhibitory.—*J. Dairy Science*, 1046-71, Sept. 1957.

Bloom Fat in Chocolate

Rate of formation of bloom on chocolate coatings appears to be influenced by moisture content of the centers. But composition of bloom fat is not affected by it.

These are among findings of studies related to composition of fat which has bloomed on chocolate. Three classes of centers—high-oil, high-moisture, and low-moisture—were coated with chocolate of 32.3% fat, packaged and stored at 70F.

Bloom developed in 7 months to 1 yr. on high-moisture center candies, 1-2 yr. on low-moisture, and 2-3 yr. on high-oil centers.

Iodine values of the bloomed fat ranged from 1.0-4.1 units lower than that of the coating fat, fatty acid was lower in olein and linolein content, and higher in unsaturated acid glycerides.—*J. Amer. Oil Chemists' Soc.*, 533-37, Nov. 1957.

Aseptic Bottling of Beer

Where a plate apparatus is used for bulk pasteurization of beer, aseptic bottling is practicable.

Thoroughly clean bottles are necessary, and final rinsing with a heavily chlorinated water is desirable. Up to 3 ppm. Cl can be used without unpleasant odors developing. Aseptic filling relies on natural resistance of beer to infection, which is considerable, as only a few microorganisms are dangerous enough to interfere with its biological stability.

Weakest link in aseptic filling is the filler. By installing a by-pass line around the pasteurizer to a point between pressure accumulating tank and pasteurizer feed pump, constant pressure on filling line and machine is readily maintained. A check valve in this line prevents unpasteurized beer from entering filling line.

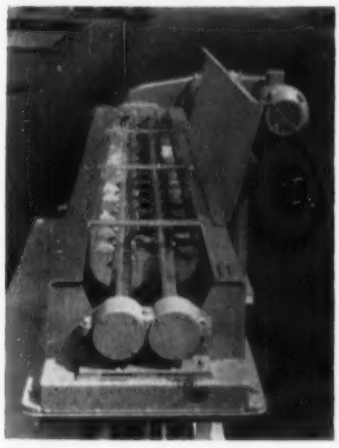
This system has worked well for 2 yr. at Stockholm Breweries. Tests showed zero plate counts at filler and, in a 6,000 bottle test, none showed any infection after 75 days. Process is not recommended for export beers where 100% sterility is desired.—*Brauwelt*, 97(43/44), 704-10, 1957.

Ropiness in Beer

Ropy beer is viscous, gushes readily, and its taste is seriously altered. Finally the viscous matter settles out, but the taste is permanently spoiled. The infection spreads readily from infected casks to young uninfected beer.

Beers of high dextrin content (3-4%), are most likely to be affected. Bacteria responsible for the disease ferment glucose and levulose

When Mixing Foods,
CONTINUOUS PROCESSING means PROFITABLE PROCESSING



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In the food processing field, these continuous mixers will mix a variety of items such as flour, baking powder, cereal by-products, fondant, cake mixes and starch jelly and do the job thoroughly and quickly. The result is a consistently uniform mix with much less handling in the mixing process and consequently less labor costs to you.

Capacities of the standard sized mixers range from a few hundred pounds per hour to one hundred tons per hour. If these do not meet your requirements, we can design and engineer special mixers to satisfy your needs.

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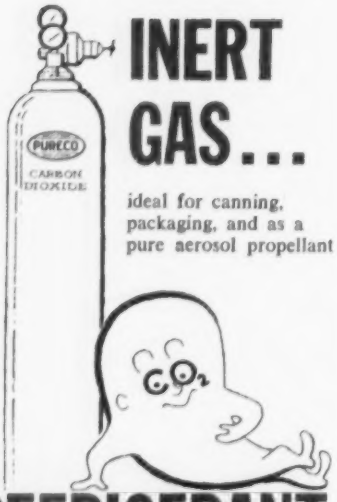

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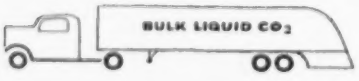

Pureco Technical Sales Service will be glad to furnish details on the use of CO_2 in the food industry. Contact a Pureco representative at the Pureco office nearest you or write the address below.

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Advances in Technology

before attacking maltose which is used up much more slowly. Growth factors such as antolyzed yeast, are necessary for the development of the bacteria.

The disease does not develop under anaerobiosis, or in alkaline media, and agitation does not impede its growth. The organism has been identified by its cultural and physiological characters as a strain of *L. pastorianus* Van Laer.—*L'Echo de la Brasserie*, 13(27), 659-65 1957 (In French).

Controlling Returned Bottles

At the Carlsberg Breweries (Copenhagen) cost records of 100% inspection of returned bottles showed that about 2% were defective. Also, that the point at which inspection costs balanced dealers debits was 5% defectives.

Calculating the curve for sampling characteristics and sample sizes showed that, by examining 150 bottles from a lot of 5,000 returns, the probability of approving lots having 2% or less defectives was at least 99%. On the other hand, lots having 10% defectives would be approved only about 2% of the time.

During first year of sampling plan, returned bottles actually improved in quality, partly because dealers no longer paid penalties for defective bottles unless the percentage in their return was high.—*Brygmesteren* 14, 329-36, 1957 (In Danish)

Wine Fermentation Bacteria

A study of 26 isolates from grape and other fruit wines undergoing malo-lactic fermentation showed that the rod bacteria concerned are non-mobile, Gram positive, and catalase negative. They produce inactive lactic acid from lactose and sucrose, and are homofermentative on glucose.

These characteristics and the small translucent, microaerophilic colonies, correspond to *plantarum* (Orla-Jensen).

The heterofermentative cocci producing the fermentation belong to the genus *Leuconostoc*. They produce acid from sucrose and pentose rather than dextran.

The homofermentative cocci capable of the malo-lactic fermentation have not been classified precisely but are believed to be *S. vini* Migula.—*Revue des Fermentations et des Industries Alimentaires*, XII(3),131-44, 1957. (in French).

Lead in Australian Wines

Lead in wines may be determined by a dithizone method following wet acid digestion of the sample.

Unwashed grapes (Australian) contained 0.01-0.98 ppm. Pb, depending on whether they had been sprayed with lead arsenate insecticides. Acid washing reduced Pb content to 0.01-0.10 ppm.

Fermentation removed 11-45% of the Pb in the juice. But fining agents, and acids normally used in wine making, did not affect the content.

Brass equipment and rubber wine hose (especially red hose) were found to be sources of lead, while stainless steels, plastics, and glass equipment were not. Contact with casks, paraffin and bottle corks did not change the lead level. Lead foil capsules (92% Pb, 8% Sn) are an important source of contamination, both during bottle storage, and on pouring into glasses.—"Factors Influencing the Lead Content of Wine". B. C. Rankine. *J. of Science of Food Agr.*, 458-66, Aug. 1957.

Bone Free Meat

Mechanical removal of bone and cartilage from meat and poultry is the basis of a patented process.

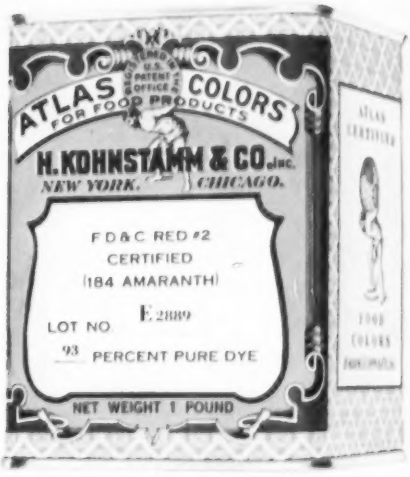
It involves cooking to shrink meat away from the bone, grinding or comminuting to a particle size not larger than ¼ in. adding liquid to produce free flowing product, centrifuging to remove bone and cartilage, and finally removing excess fluid to leave bone-free product.—U. S. Patent 2,799,584, July 16, 1957.

Quick Tests for Protein

Two fast, reliable, inexpensive methods for measuring protein in food products have been developed by USDA scientists.

One method is based on the reaction of protein with copper ions to form a violet Cu salt. In practice, freshly ground wheat or flour samples are treated with the reagent —consisting of alkali, Cu, and glycerine. Intensity of violet color produced is read in a colorimeter, and

FOOD NEEDS COLOR



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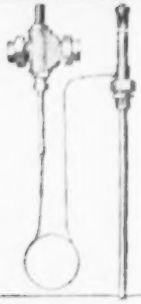
Low-cost Temperature Control — by SARCO

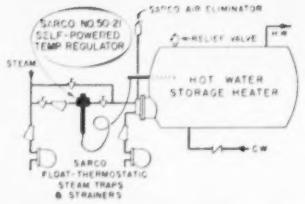
Self-Powered and Electric Indicating



Sarco Temperature Controllers
Self-Powered . . . Fully Modulating

Simple as ABC . . . a thermostat with capillary tubing and a valve. That's all! Operated by liquid expansion. Automatic. Self-powered . . . no electricity or compressed air required. Self-contained . . . no exposed mechanism. Packless valve . . . no stuffing box to leak or stick. Easy to install by any pipefitter.

Furnished with thermostats suitable for any liquid or for air in dryers, ovens, air ducts, etc. Valve sizes . . . ½ to 6". Temperature ranges to 300°F. *Bulletin 620-2.*

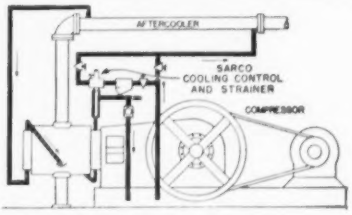


Typical applications: Shell and tube heat exchangers; condensers, oil storage tanks, dryers, etc.

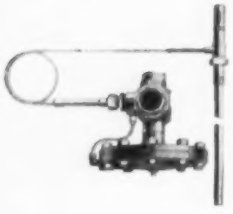
Sarco Cooling Controls
Self-Powered . . . Fully Modulating

Simple, compact, automatic thermostatic valve. Eliminates overcooling and undercooling. Saves water. Overall height of ¾" size is only 17⁵⁄₁₆". Self-powered . . . requires no electrical or compressed air hook-up. Valve and bulb all in one unit. No exposed mechanism. Single-seated packless valve . . . not affected by silt or scale-forming minerals.

Valve sizes . . . ¾ to 1½". Temperature ranges between 40° and 210°F. *Bulletin No. 710-B.*



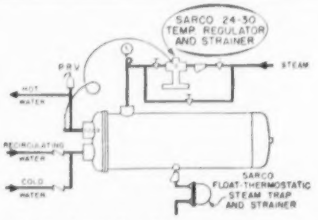
Typical applications: compressors, small engines, water-cooled bearings, condensers, dry cleaning stills, etc.



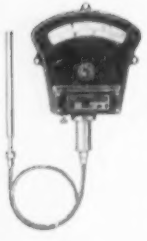
Sarco Temperature Controllers
Self-Powered . . . Single-Seated, Tight-Closing

A simple, self-powered automatic temperature controller with diaphragm-operated, pilot-controlled valve. Designed for intermittent service or service involving long periods with practically no call for steam. Self-powered by liquid expansion . . . no electricity or compressed air needed. Packless.

Valve sizes . . . ½ to 3". Temperature ranges to 300°F. *Bulletin No. 625-B.*



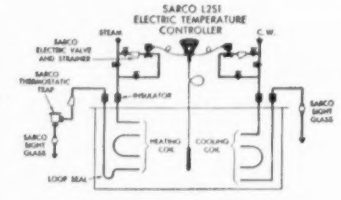
Typical applications: instantaneous heaters, fuel oil pre-heaters, high pressure applications on hot water storage tanks.



Sarco Electric Temperature Controllers
Indicating Type

Simple, inexpensive, electric-indicating automatic temperature controller. Sensitive enough to perform many of the functions of much more elaborate recorder-controllers, at a fraction of their cost. Responds to changes of ± ½°F. Adjustable. Large, easy-to-read scale shows both actual and set temperatures.

Temperature ranges between minus 90° and plus 650°F. Offers many sequence combinations such as step-heating. *Bulletin 1025-B.*



Typical applications: plating tanks, processing vats, kettles, chemical tanks, etc.

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Electrically Operated

For remote control by hand or thermostat. Open and shut operation. Can be equipped with semi-modulating mechanism. Powerful hydraulic action operates valves up to 5" single-seated, or 8" double-seated, at pressures up to 175 psi. Ruggedly constructed . . . to withstand severe use without constant supervision and with minimum maintenance. Operates in any position.

For direct connection to 110 volts A. C., 60 cycle current. Valve sizes . . . ½ to 5" single-seated; ½ to 6" double-seated. *Bulletin 1050-A.*

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the readings converted to protein values by special charts.

Second method is based on a reaction of orange G dye and proteins which forms an insoluble protein complex. In practice, a known amount of dye is added to the protein-containing sample and the mixture agitated to complete reaction.

Insoluble complex is separated by centrifuging and concentration of unbound dye in supernatant solution is determined colorimetrically. Protein content of sample can be read directly from special table.

Latter method takes about 5 min., and has been used effectively on wheat and barley products, and on dry and whole milk.—*Agricultural Research*, Dec. 1957, (USDA, Washington, 25.)

Storage of Hops

Measurements of equilibrium relative humidity of stored hops indicate that it changes with style of packing and moisture content. For seedless hops in bales (9.4% moisture), equilibrium relative humidity was 64% at 68 F., 68% at 41 F., and 75% at 14 F.

A hard-pressed, 13% moisture hop needed relative humidities of 72, 76, and 82% at the same respective temperatures to maintain moisture equilibrium. Hops kept in hermetically sealed bags retain their moisture well.—*Brygmesteren*, (E.B.C. issue) 159-64, June 1957.

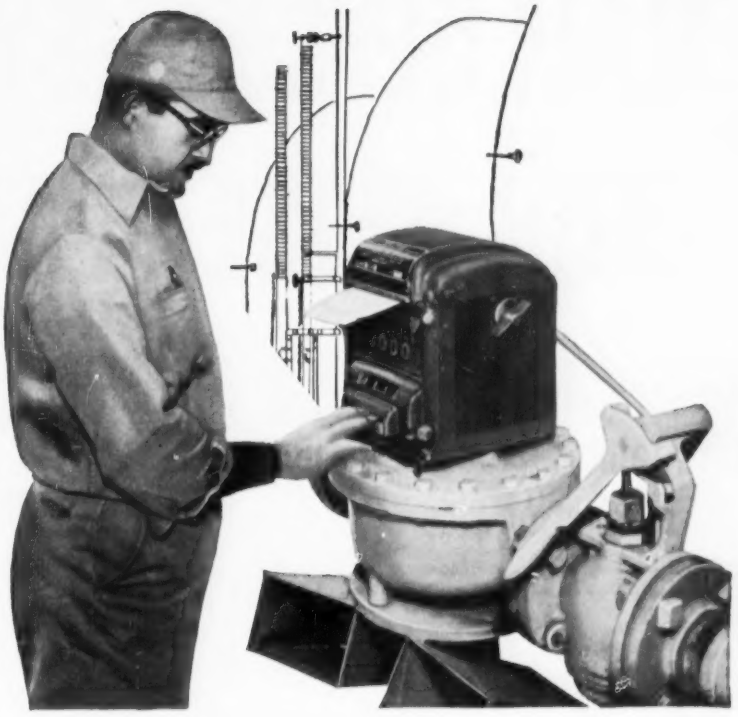
Corrosion of Tin

Concentration of chrysanthemin in a fruit syrup can be estimated from the height of the optical density curve at 510 mmu.

Thus a sample of raspberry syrup was found to be 0.00116 molal in chrysanthemin, or sufficient to dissolve about 28 mg. of tin per liter. Since the syrup would actually dissolve about 120 mg. tin/l., other solution factors must be active in it.

Depolarizers that could be active are cyanidin, a precursor of chrysanthemin, and the flavonol, quercetin which has been isolated from yellow plums.

In lacquered cans the side seams and places where the lacquer is fractured may have their exposed tin completely dissolved, permitting attack on the steel by the fruit acids with evolution of hydrogen.—*J. of Applied Chem.*, 7(5), 231-38, 1957.



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NEPTUNE *liquid* METERS

Get printed proof of delivery and automatic control of liquids going into the batch . . . with the Neptune Print-O-Meter. Prints exact quantities, with serial numbers and code letters to identify the batch and/or station. Foolproof operation . . . ticket is inserted and locked in place in meter before delivery. Ticket cannot be removed before being printed out.

You get quality control and dispute-free printed records of delivery if you handle any of these liquids (and others too!). Print-O-Meter sizes: 1 to 4 in., capacities 5 to 500 gpm. Other meters 2 to 1000 gpm.

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Benzol	Methyl Formate
Borax Solution	Methyline Chloride
Brine	Mineral Spirits
Bunker "C"	Molasses
Butanol	Naphtha
Calcium Chloride	Oleic Acid
Carbon Bisulphide	Oleum Spirits
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Formaldehyde	Tallow
Freon	Tannic Acid
Fuel Oil, Hot	Trichlorethylene
Glucose	Tungwood Oil
Glue, Water Sol.	Turpentine
Glycerine	Varnish
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GALLUP SURVEY REVEALS FOR ANISE FLAVORING IN

Are You Overlooking Profitable Markets as Shown in This Nationwide Survey.....▸

There are many appetizing flavors on the market today, but here's one that appeals strongly to one out of every three adults in the U. S.

It's anise—made in this country under the name of anethole.

Anise, or the closely similar licorice taste, has a strong army of supporters—as shown by a recent Gallup Survey—to merit its use in many products where a variety of flavors is now offered.

Perhaps one reason why anise, in recent years, has been overlooked is the unreliability of supply of oil of anise from Red China.

Today, American-made anethole is available in full commercial quantities, meeting U.S.P. specifications. Manufactured under rigid quality controls, and from a plentiful domestic raw material source, anethole opens the way for you to include anise-flavored products in your line without worries over fluctuations in supply.

Ask your regular supplier for Hercules® anethole or flavors based on anethole.

HERCULES POWDER COMPANY
Wilmington 99, Delaware

IN HARD CANDIES

IN CHEWING GUM

IN CAKES & COOKIES

This survey was conducted in March, 1957 by Audience Research, Inc. as part of its National Opinion Trends reports and is reproduced by permission of the Gallup Organization, Princeton, N. J. A total of 1,627 personal interviews, consistent with the distribution of the adult population, were conducted by trained Gallup Poll interviewers. Since "anethole" and "anise" are both terms unfamiliar to the majority of the American public, the flavor was first described as "licorice." When

HERCULES ANETHOLE

SUBSTANTIAL PUBLIC VOTE FOODS AND CONFECTIONS

44% WOULD LIKE

31% WOULD LIKE

30% WOULD LIKE

specific preferences in cakes, candy, and gum were asked, the respondent was told "there is a flavor called anise which resembles licorice . . . suppose the following products were made with a mild licorice flavor or anise taste?" Since it is recognized in the chemical industry that anethole, U.S.P., is equivalent to imported anise, and has been used for years, the findings of this survey on anise flavor preferences can readily be applied to anethole.

Further Facts from This Survey on Public Preference for Anise

- Nearly 34,000,000 adults (based on the estimated U. S. adult population of 103 million) are real fanciers. Also, another 16,500,000 adults like the flavor.
- A larger proportion is in the upper economic group.
- There is a slightly larger proportion of women than men fanciers.
- More younger adults than older persons say the anise flavor would appeal to them.
- Strongest regional areas of preference are the East and the West, and in communities of over 500,000 population.
- Those that like the flavor are strongly in favor of it!

NOS7-1

HERCULES **ANETHOLE**

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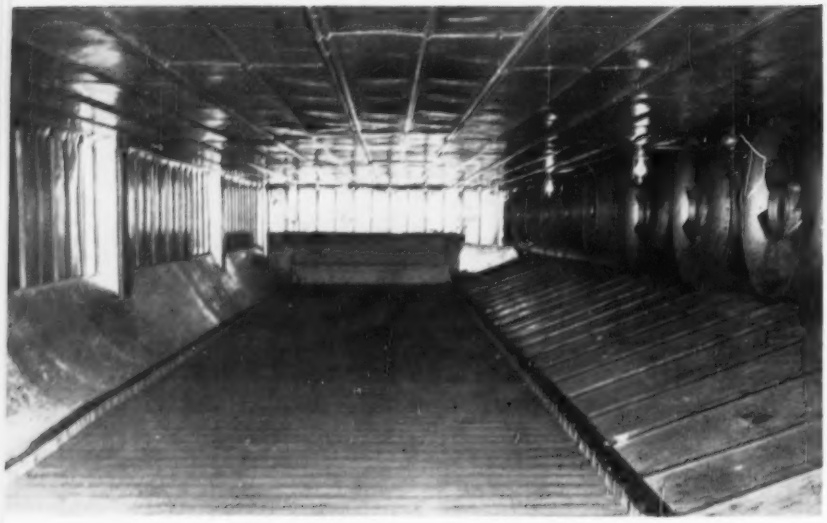


"Astute redesign doubled this tunnel's output at Smith Frozen Foods. Note simple layout of air plenum above 5 ton-per-hour belt, also the metal-clad interior."

Modern Freeze Tunnels

They are turning out more with less machinery, power, space, and labor. Here are practical tips on belt-tunnel operation and equipment selection—particularly belts, air cycles, pre-coolers, coils, and high-side units . . . Sanitation requirements detailed

ENGINEERED ECONOMY is the keynote of today's freezer-tunnel operations.

With profit margins so close, no processor can afford to get less than top equipment performance. Nor can he tolerate idle compressor horsepower just for the sake of convenience.

In short, he must now get more production in less space—and at lower cost.

By present standards, any belt tunnel more than six years old is obsolete. In spaces formerly required to house 2-ton-per-hr. units, capacity has been upped to 5 tons per hr. The fact is that 2-2½ ton-per-hr. tunnels are just too small to be operated economically in today's volume market. Now, outputs of 4-5 tons per hr. are considered minimum, while some tunnels handle as much as 8 tons per hr.

It is important to note that initial cost of refrigeration equipment has actually dropped in the past twelve years. In 1945, refrigeration and belt machinery cost $25,000 to $27,000 per ton of product per hr. for a 5-ton-per-hr. tunnel. Today, comparable equipment costs $22,000 to $24,000.

Three factors, primarily, account for this reduction:

1. Development of rotary ammonia booster compressors, which are less expensive than piston-type units.

2. Availability of compact high-speed V-W compressors to replace costlier vertical single-acting machines.

3. Modern tunnel design, which stresses realistic equipment selection and boosts overall operating efficiency.

To pinpoint these factors, we will present design and performance data for modern belt-type freezers handling loose peas. Naturally, the salient principles will apply to many other products.

M. R. OVERBYE

Sales Engineer, York Division, Borg-Warner Corp., Seattle

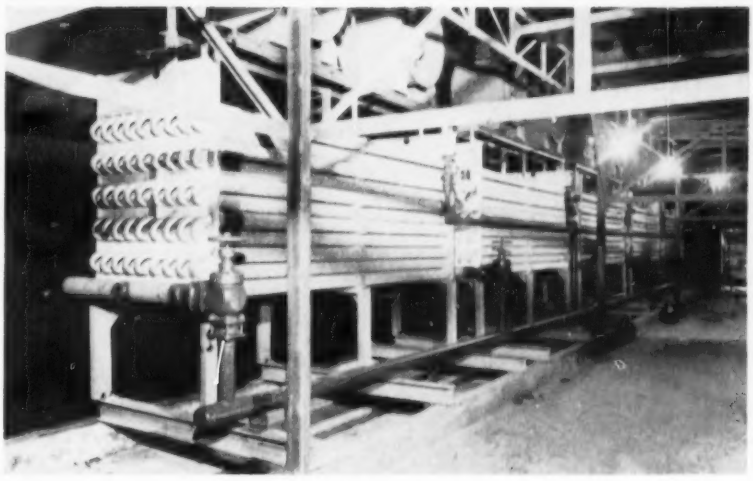
FREEZING BELTS

Narrow-width belts, typical of earlier designs, result in long tunnels which are uneconomical today. Probably the most economical width is 8 ft., although 10-ft.-wide belts are available. However, they usually entail a premium price for belt machinery.

Variable-speed drives (2-8 fpm.) are desirable, and in extreme cases speeds up to 18 fpm. are required. Also, different varieties of product may call for slight changes in belt loading and freezing mesh.

A standard general-purpose mesh is 17 gage, 5 mesh (0.146-in. openings), galvanized. Although stainless-

"Multiple finned coils of this unit at Stokley-Van Camp permit sequential defrosting for 24-hr. operation at full capacity of 4 tons per hour."



Really Boost Performance

steel belts are advantageous from the standpoints of sanitation and durability, their higher cost is difficult to justify in view of the life of conventional galvanized units.

Normal belt loadings range 5 to 6 lb. of peas per sq. ft., or product depths of 1.3 to 1.6 in. There are variations in practice, particularly when belts are operated with very light loads or at very high speeds.

The economics of light vs. heavy loading may be summarized as follows:

Extremely light loading (one pea deep, with much open area on the belt for air passage) calls for use of large volumes of circulated air. But lower static pressure is required. This results in greater belt area per ton of product, thus larger tunnel areas.

On the other hand, heavily loaded belts (1.5 in. or more) can be operated successfully with less air and at higher static pressures. This permits use of much smaller belts and tunnels.

Most modern tunnels are of the heavy-loaded type, in which the bed's resistance to air flow enables uniform distribution of air through the product. Although heavy loading is generally preferred, a good job can be done either way, provided there is proper engineering and selection of components. Discussion from this point will refer to heavy belt loadings.

AIR-CYCLE DESIGN

The simple material, air, is the most used, most ignored, and least understood phase of tunnel operation.

More freezing tunnels fall short of capacity because of poor air-cycle design than through lack of refrigeration.

Remember, the compressor cannot do any more work than is absorbed by the evaporator coils. They, in turn, cannot absorb any more heat than the air picks up and transfers from product to coils.

Air-cycle equipment must have sufficient capacity to keep the total air range somewhat below 8 F. Moreover, adequate static pressure must be available even under abnormal conditions, such as frosted coils near the end of a shift. About 30,000 to 35,000 cfm. will be required per ton of product frozen.

The best way to distribute air through a freezing belt is simply to discharge into a plenum chamber designed for uniform static pressure. This arrangement will bleed air uniformly through the bed without use of turning vanes or baffles. With this method, 4-in. depths of peas have been successfully frozen.

However, when a belt designed for heavy loading and such air distribution carries extremely light loads with gaps, air tends to bypass through the gaps. This causes an area of soft peas to form around the hole, the air having taken the path of least resistance instead of traversing the entire bed.

For maximum efficiency, belts must be loaded continuously and uniformly.

Compact axial-flow fans are well suited for air-cycling. They can be installed in sufficient numbers to provide uniform distribution through the coils and into the plenum chamber for nearly the full length of the tunnel.

Air travel through main tunnel belts may either be up or down through the product. In most cases, the simplest arrangement is a down-through air movement returning to the bottom coils.

Temperature of air coming from the coils should be −10 F. For operation in an 8-deg. range or less, sufficient air would have to return to the coils at about −2 F. Then, with −35 F. evaporator temperature, you have a very economical system.

How Does Your Tunnel Compare?

Here are some general design standards based on a pea-freezing tunnel handling 5 tons per hr. If your setup requires more of any of these items, it may be costing you too much:

1. Space—2,000 sq. ft. of floor area, 12 ft. of height, including pre-cooler. This requirement can be cut sharply by use of multiple belts stacked one above the other, if ceiling height permits, or with pre-cool room above main tunnel.
2. Belt machinery—1,000 sq. ft. of total effective belt area (200 sq. ft. per ton of product per hr).
3. Equipment cost—$110,000 to $120,000 for refrigeration and belt machinery delivered and installed ($22,000 to $24,000 per ton of product per hr.).
4. Compressor horsepower—425 (85 hp. per ton of product per hr.).
5. Downtime for defrost, shift changes, and cleanup —3 to 4 hr. per 24-hr. day.

AIR-WATER TYPE PRE-COOLERS

The term "pre-cooler" is commonly given to units of the air type, whereas those employing water are known as hydro-coolers. Both are designed to drop product temperature to about 34 F. and to feed the main belt.

With a pre-cooler, extremely close control of air temperature is required on light loads. This is necessary to prevent the coils from rebalancing themselves against the extra compressor capacity available. Such action could lower temperature sufficiently to initiate freezing, causing partially frozen product to stick to the pre-cooler belt.

Pre-coolers are not to be confused with "pre-freezers," which put a glaze on the pea before it enters the main tunnel. Such glazed products require agitation to get them free-flowing.

Formerly, this technique was considered as a means of keeping peas frozen individually, thereby aiding their removal from the main tunnel belt. However, modern equipment design, particularly in the air-cycle and the belt-loading areas, eliminates the problem.

Hydro-coolers have occasionally replaced air pre-coolers. In some cases both types are used, initial pre-cooling being done with water and final cooling with air.

TUNNEL COILS

There are three principal types of freezing-tunnel evaporator coils in use: (1) Bare pipe coils, (2) fin coils, and (3) factory-built air-handling units, either dry-coil or brine-spray.

Very few successful tunnels employ factory built units, because of their air-handling limitations. Then, too, pea-freezing tunnels are so large that multiple units would be required, thereby increasing costs.

Actually, tunnel coils should be designed around the defrosting problem. Tunnels are usually defrosted at every meal time or shutdown for any other purpose. During these short periods, it is necessary to do a quick and thorough defrosting job and have the tunnel ready to receive product for the next shift.

Use of finned coils in the tunnel is best by far. They have a large secondary surface and a small primary surface, compared to bare-pipe coils. As a result the ammonia charge is only a fraction of that required for a bare-pipe tunnel coil.

When finned coils are fed by a liquid-ammonia recirculating system, they provide the two basic requirements of a good tunnel coil—high capacity and efficiency, and rapid defrost.

Our diagram details a typical coil system with liquid-ammonia circulation and top feed. The inset shows a similar setup employing bottom feed. Note that the latter coil is fed in a manner similar to a conventional full-flooded evaporator, which, in effect, makes it a full-flooded evaporator with circulation augmented by a pump.

In an arrangement employing a top-fed coil, the low-pressure receiver is located below coil level. Thus, ammonia drains into this receiver almost instantaneously when the pump is shut down, or a valve in the supply line to the coil is closed.

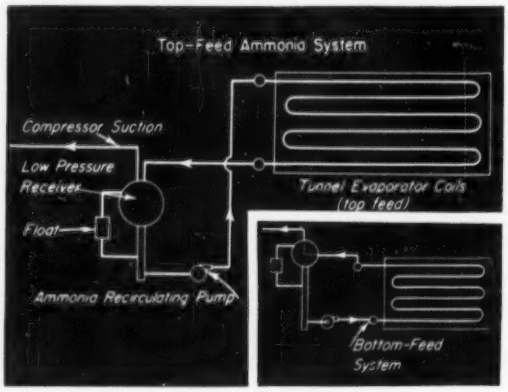
The receiver, in this case, must be sized to hold the entire coil volume. Therefore, it must be large enough to handle the charge and still contain sufficient surge space to prevent carryover of liquid ammonia to compression equipment. Adequately sized, it is an excellent liquid separator.

Starting the ammonia pumps places the coil under instant refrigeration, since it operates with a much smaller charge.

When ammonia is drained by stopping the pumps, coils can be quickly defrosted either with water, hot gas, or a combination of both. Defrost can be made automatic even to the extent of using draft gages on coil inlet and outlet (for determining pressure drop through the coil) as an indication of frost buildup.

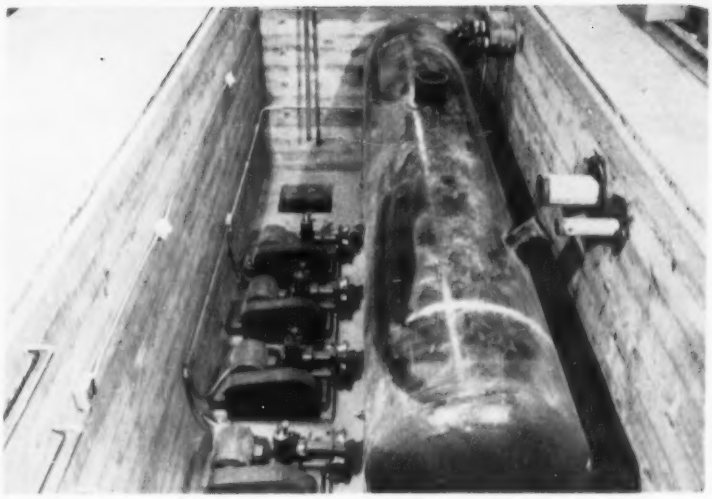
In addition to very rapid defrost, this system permits higher coil capacity by increasing refrigerant velocity, preventing oil-logging of evaporator, and holding the entire coil surface at saturation temperature.

However, it is important that the evaporator be specifically designed for top-feed recirculation, if that technique is to be employed. Almost any evaporator can be



TYPICAL COIL SETUPS: In top-fed system, low-pressure receiver below coils permits rapid draining of ammonia for defrost. Inset (lower right) shows similar arrangement but with bottom feed.

"Low-pressure receiver, installed in pit at Stokely-Van Camp, employs four liquid-ammonia pumps in top-feed, rapid-defrost system."



bottom fed, but in a top-fed setup each feed must be orificed. Also, loading and length of each run must be considered in sizing orifices for proper distribution.

With liquid-ammonia recirculation, since fluid is at its flash point, recirculating pumps must be expressly designed to minimize pressure drop. Sufficient head must be maintained on pumps at all times to overcome resistance through pump, piping, and valves to prevent flashing or vapor lock.

A gear-type pump or positive-displacement unit specifically designed for the service will give excellent results, although some rotary and centrifugal pumps have been used. However, they generally require much greater static head.

It is safe to say that any existing tunnel coil, either finned-pipe or bare-pipe, can be improved by pump recirculation. Methods vary with construction and circuiting of coils.

In working with existing coils, top feeding generally is not practical without recircuiting the coil. But if the low-pressure receiver is below coil level, latter can still be drained by an extra dump line. Amount of ammonia recirculated can vary from 3 to 8 times that being evaporated.

Where continuous 24-hour operation is required, it may be desirable to use multiple coils with sequential defrosting. The photo on p. 113 shows such a multiple installation. Of the five coils in the tunnel, any four are able to operate at design load of 4 tons per hr.

In this arrangement, any coil can be run for 4 hr and shut off for 1 hr. for defrost.

HIGH-SIDE EQUIPMENT

Selecting and balancing high-side equipment probably is the simplest part of the freezing problem.

For economical design, use −35 F. evaporator temperature to minimize horsepower requirements. In conjunction with a properly selected high-capacity coil, it provides a balanced system with low initial and operating costs.

Pressure drops in suction piping must be carefuly considered, especially where runs are long. Often this is underestimated. Remember, at −35 F. evaporator temperature a 1-lb. pressure drop in the suction line causes about a 3-deg. temperature difference between compressor and evaporator. Be sure these line losses are taken into consideration.

Compound-compression systems should be balanced realistically, since any tunnel is subject to large overloads that tend to drive both evaporator temperature and intermediate balance point upwards. This has a drastic effect on booster horsepower, and must be considered in sizing of motors, particularly for booster compressors.

A common mistake is use of too many small compressors. Although a certain amount of flexibility is desired as a plant grows, the number of machines to get on and off the line after defrosting and shutdown becomes a major problem.

There are many more plants troubled by too many small compressors than from lack of flexibility with too few compressors.

Capacity requirements are increasing in our expanding economy. Centrifugal compressors, which had been used only in larger plants, are now coming into the picture where capacity exceeds 10 tons per hr. They may be used with direct Freon-12 recirculation, or as a cascade condensing system handling ammonia which is then recirculated to conventional evaporators.

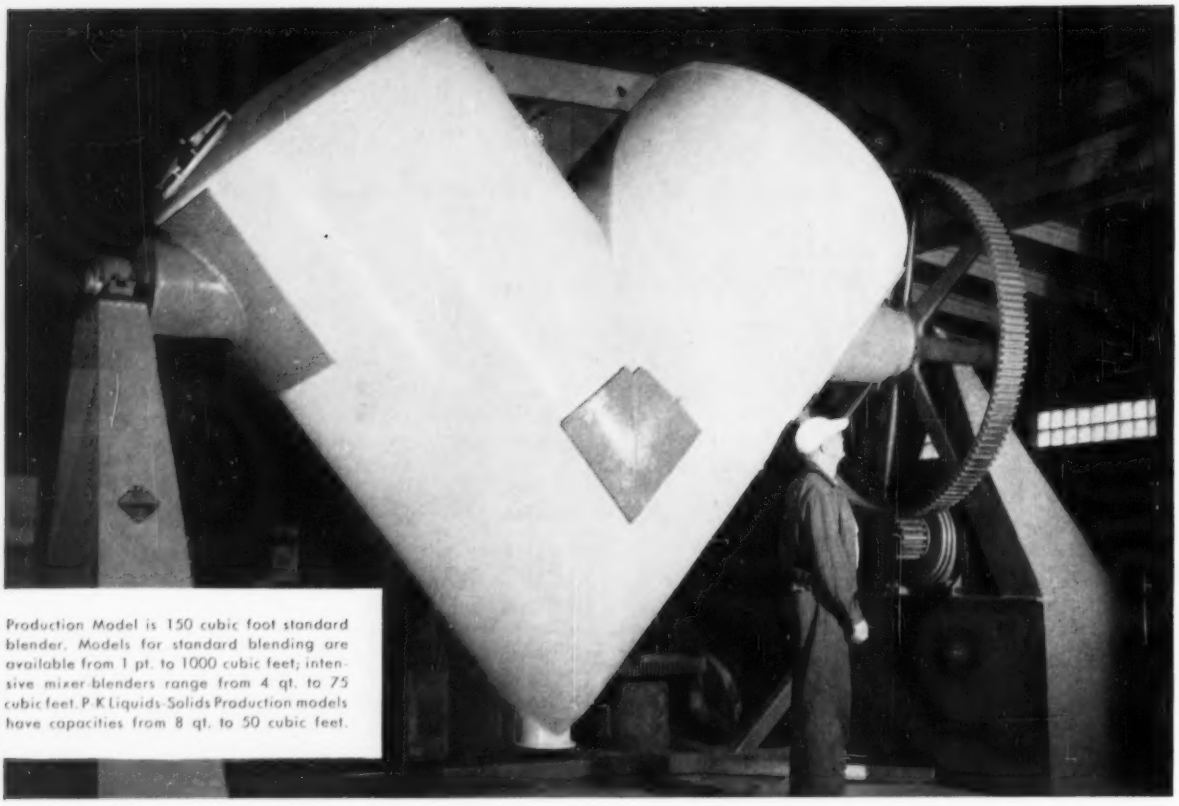
Such systems afford the ultimate in automatic control. They minimize operating and maintenance time, since even the largest centrifugals can be brought to full-capacity operation in just a matter of minutes.

WHAT ABOUT SANITATION?

Early freezing tunnels were built primarily of wood, and any accessibility to belts and freezing machinery was accidental rather than by design.

Today's tunnel should have no wood exposed. There should be either a concrete or steel floor, preferably with a steel recessed defrosting basin at least under the coils and running the full length of tunnel. Floor construction should channel all tunnel wash water into this basin so that it drains to sewers.

Tunnel insulation should be of board form, preferably a type not damaged by water. A metal lining is preferred over the entire tunnel exterior, which permits complete washdown of the whole facility. Coils, belts, and all gears should be laid out for complete access, not only for maintenance, but also for proper sanitation. —*End*



Production Model is 150 cubic foot standard blender. Models for standard blending are available from 1 pt. to 1000 cubic feet; intensive mixer-blenders range from 4 qt. to 75 cubic feet. P-K Liquids-Solids Production models have capacities from 8 qt. to 50 cubic feet.

Production Results Prove Superiority of P-K's New Blending Concept

Leading companies in virtually all the chemical and process industries have found that P-K "Twin-Shell" blenders have met their blending requirements better . . . faster . . . and more economically than conventional mixer-blenders.

P-K makes 3 types of "Twin-Shell" models to meet practically all blending functions – there is a production model for standard precision blending, a model for *intensive* mixing-blending, a model where exact quantities of liquids are introduced and intimately blended into dry solids.

These models are all based on P-K's radically different "Twin-Shell" blending concept which has a proven mechanical advantage that pays off in fast, consistently uniform blends . . . dust-free, moisture-proof operation . . . and quick, easy discharging.

The fundamental "Twin-Shell" mixing principle combines a gentle rolling, folding and dividing action within the entire mass of material to create a rapid and uniform blending of formulations regardless of varying particle size, shape or density. Furthermore, the smooth, interior of the "Twin-Shell" blender shape affords complete accessibility for fast, easy cleaning – quick changeover for new formulations without fear of contamination.

Prove these benefits yourself at P-K's Customer Service Lab

P-K can help you to determine accurately the right type of "Twin-Shell" blender for your needs. Complete lab facilities are available for blending materials from 4 qts. to 3 cubic feet (working capacities) – comparison tests can be made on the spot. You and your staff can conduct your own blending studies . . . or you can utilize P-K's qualified blender technicians to assist you in product research. This service is available without obligation because P-K recognizes that more and more companies realize the importance of pre-testing before purchase – they realize too, the need to keep their present blending methods up-to-date. If it is impossible for you to conduct these tests personally, arrangements can be made for you to send us your formulations for testing. In either case, contact Russell Dotter at P-K.

For technical data on P-K "Twin-Shell" blenders for production or laboratory use, write for bulletins 15a-1 (lab) or 15 (production). The Patterson-Kelley Co., Inc., 2012 Hanson Street, East Stroudsburg, Pa. Phone: Stroudsburg 820.

All P-K "Twin-Shell" blenders are patented and the name registered.

15

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Restaurants Okay DF Peas–Here's Why

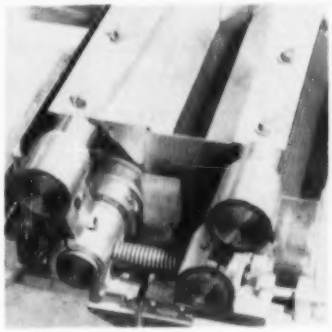
Quality and economy of dehydrofrozen peas were proved by recent USDA tests in 100 Milwaukee restaurants.*

Supplied with a week's servings, restaurateurs report that DF peas:

- Compare favorably with the frozen item in ease of preparation and cooking. Over half found them as easy to prepare as canned peas.
- Look better than frozen peas after cooking. Test product is greener and firmer (skins less wrinkled), more closely resembling fresh peas.
- Surpass other packs in maintaining freshness, flavor, and appearance after a considerable time on steam table.
- Offer important savings in usually scarce freezer-storage space.

Operators prefer the 2½-lb. package for DF peas, which is equivalent to 5 lb. of frozen product. Although latter was available at about 24c. per lb., they were willing to pay as much as 27c. per lb. (reconstituted basis) for the DF's.

* *Restaurant Acceptance of Dehydrofrozen Peas*, Report No. 198, Marketing Research Div., Agricultural Marketing Service, USDA, Washington, D. C. Test noted FE Nov., p. 133.



SKIN-SLITTING with this plant unit curbs wrinkling of DF peas when cooked. Skins are cut between circular knives and rubber roll.

Latest Dehydrofrozens Cut Costs

Only partially dried to curb damage, they save on container, storage, and shipping charges . . . Cost and quality comparisons given for peas, dehydrofrozen and frozen . . . DF pimientos, carrots, and apples now also available

THERE'S GROWING INTEREST in dehydrofrozen products, both for remanufacturing and commercial markets.

For it's now clear that these items, despite being partially dried before freezing, combine startlingly high quality with unusual economy.

The dual process cuts the weight of several fruits and vegetables about 50%. With pimientos, 65% reduction is possible. Products rehydrate well, also have good texture, flavor, and color.

Major advantage of dehydrofreezing is this substantial saving in weight and bulk–with product moisture remaining sufficiently high to curb irreversible quality changes.

With peas, for example, dehydrofreezing offers a saving (over the conventionally frozen pack) of more than 2c. per lb., raw basis. Handling costs at all stages of manufacture and distribution are less, and storage-space requirements in users' plants are materially reduced.

If all frozen peas packed in institutional containers (over 1 lb. each) in 1956 had been dehydrofrozen, total savings would have been $3-4 million.

Preparation of peas (and other items) for dehydrofreezing is similar to that required in conventional freezing–cleaning, sizing, washing, blanching, etc.

C. L. RASMUSSEN, D. W. VENSTROM, H. J. NEUMANN, R. L. OLSON, W. C. ROCKWELL and K. STRONG

First five authors with Western Utilization Research & Development Division, Agricultural Research Service, USDA, Albany, Calif. Last named author with Lamb-Weston, Inc., Weston, Ore.

Drying is best accomplished in a continuous unit, such as WURDD's belt-trough dryer (FE July 1955, p. 43), which keeps the peas rolling gently and dries them uniformly.

Next, product is packaged and frozen. Or it may first be frozen on trays or belts, then packaged. Thereafter, handling of the dehydrofrozen item is the same as for frozen peas.

These procedures have produced high-quality dehydrofrozen peas experimentally. But a raw-material factor prevented perfect rehydration. When cooked, many of the peas remained wrinkled.

However, mechanical slitting of the seed coat virtually eliminated the defect. Thus, reconstituted peas were plump and essentially wrinkle-free. Skin-slitting is done with available equipment (Urschel Laboratories, Inc., Valparaiso, Ind.).

Quality Comparisons

From a quality standpoint, dehydrofrozen products have the following advantages over frozen items:

1. **Less weight and bulk**
2. **Less drip on thawing**
3. **Easier moisture control in processing**

And compared with dehydrated products, the dehydrofrozens offer:

1. **Easier and better rehydration**
2. **Superior flavor, texture, and color**

In addition, reduction in weight and bulk of dehydrofrozen foods makes their packaging, storage, and shipping cheaper than for frozen items. Additional cost of drying fruits and vegetables is minor when con-

More DF Products On-Way

Dehydrofrozen produce is now being supplied by several companies, most prominent being Lamb-Weston, Inc., Weston, Ore., and California Vegetable Concentrates, Inc., Huntington Park, Calif.

In fact, interest in this technique has spurred development of two allied processes—dehydrobrining and dehydrocanning—which also cut costs and boost quality.

Pimientos, peas, carrots, and apples are offered for commercial or test use. WURDD has successfully dehydrofrozen apricots, but as yet no packs are available.

Lamb-Weston is reported to be the largest supplier of DF peas and carrots, while C.V.C. leads in production of DF pimientos. This company aided WURDD in perfecting the belt-trough dryer, which is employed in its Modesto, Calif., plant. C.V.C. is also said to be dehydrobrining pimientos.

Major markets are processors of soups and cheese.

Further, dehydrocanned apples have been offered to bakers by Ross Packing Co., Selah, Wash. And DF apples may now be obtained from the Wm. McIntosh Co., Inc., Geneva, N. Y.—The Editors.

TABLE I—HOW DEHYDROFREEZING Cuts Product Moisture Content, Bulk

Item	Percent Moisture		Water Removed	WT. & Vol. Reduction
	Original	Final	(%)	(%)
App'es	85	70	59	50
Apricots	85	70	59	50
Carrots	88	76	57	50
Peas	75	50	67	50
Pimientos	92	77	71	65

TABLE II—RELATIVE COSTS for Variously Frozen Peas Show Dehydrofreeze Economies (Basis: 100 lb. of Product)

Cost Item	Dehydrofrozen	Frozen	Savings by Dehydrofreezing
Drying	$0.50	$....	$....
Freezing	.25	.50	.25
Container	.97	1.93	.96
Storage*	.56	1.11	.55
Transportation*	1.13	2.25	1.12
Total cost	$3.41	$5.79	$2.38

* At prevailing rates.

TABLE III—PACKAGE, STORAGE, SHIPPING COSTS for Dehydrofrozen and Frozen Peas (Basis: 100 lb. Raw Peas)

	Dehydrofrozen	Frozen
Raw material, lb.	100	100
Product packaged, lb.	50	100
Number of 2½-lb. cartons required	20	40
Number of shipping cases	1⅔	3⅓
Weight of packaged product, lb.	55.7	111.3
Container:		
Cartons at 2.6c	0.52	1.04
Overwrap at 1.4c	0.28	0.56
Cases at 10c	0.17	0.33
	$0.97	$1.93
Transportation:		
$2.02 per cwt., Milton, Ore., to Chicago	1.13	2.25
Storage:		
For 6 mo. — 25c. per cwt. for 1st mo., 15c. per cwt. for each succeeding month		
Total rate: $1 per cwt	$0.56	$1.11

tinuous-type dehydrators are used. Table I shows, for various products, how much water is removed.

Here are cooking directions typical of institutional practice:

Put 2½ lb. of dehydrofrozen peas in 2 qt. of cold water, add 1 tsp. of salt, and quickly bring to a boil. Cook 5 to 7 min. until tender.

Some modifications are required when larger quantities are cooked in various equipment.

Cost Advantages

Table II summarizes relative costs of processing peas by dehydrofreezing and conventional freezing. Also it lists the savings achieved by dehydrofreezing, which are mainly in packaging, storing, and transporting.

Other less tangible savings are realized in handling and processing of dehydrofrozens in users' kitchens. The only additional plant cost results from drying, which adds somewhat more expense than the amount saved in subsequent freezing.

Since actual operating conditions are not known, comparisons are hypothetical. For example, we can only make assumptions with respect to type of dryer used, fuel and power efficiencies and costs, types of packaging, storage periods, shipping distances, storage and transportation rates.

The following data merely indicate the order of magnitude of major cost differences between dehydrofreezing and freezing. Relative costs for packaging, storage, and transportation are shown in Table III.

1. Drying 100 lb. of raw green peas to 50% weight reduction requires removal of 50 lb. of water. Generally, it costs from ½ to 1c. to evaporate 1 lb. of water in an air-flow dehydrator. At the higher rate, this amounts to ½c. per lb. of raw peas.

2. Freezing 1 lb. of material costs less than evaporating 1 lb. of water. Because only 50 lb. of partially dehydrated peas must be handled, freezing costs are cut. Net savings with dehydrofrozens average ¼c. per lb. of raw peas.

3. In packaging, a 50% reduction in bulk cuts container cost proportionately for a given container size. Dehydrofreezing is considered ideal for institutional and remanufacturing markets because no change in container size is required.

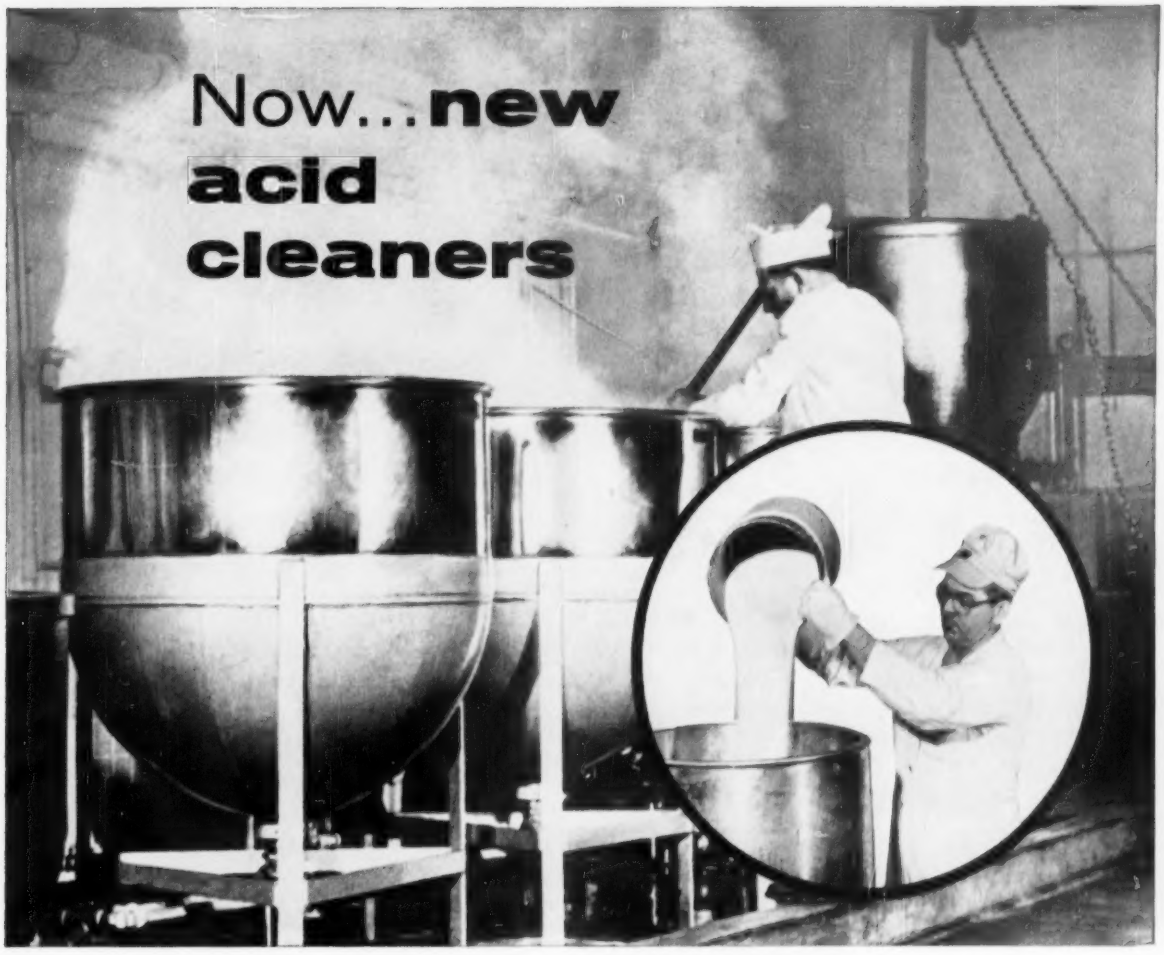
For cost-comparison purposes, it is asssumed that frozen and dehydrofrozen peas will be packaged in 2½-lb. cartons, 12 to a case. This pack probably is the most popular for peas delivered to restaurants. In 1956, 66 million lb. of frozen peas, or nearly a fifth of all peas frozen, were packaged in 2½-lb. cartons.

Frozen peas are usually packaged over a short season, which entails storing them for almost a year. Assume 6 months' storage for dehydrofrozen and frozen peas.

Transportation costs are based on shipping from the West Coast to Chicago. This probably represents an average haul, since 75% of all frozen peas are packed in the West, and the largest markets are east of Chicago.

Canned peas are not included in this comparison, because the two products have somewhat different markets. However, use of tin cans and the packaging of peas in brine make container, storage, and transportation charges even higher than those for frozen peas.* —*End*

* For a detailed comparison of canning and freezing costs of several vegetables, see "A Pictsweet Study," H. E. Sandoz, *Food Packaging*, May 1954.



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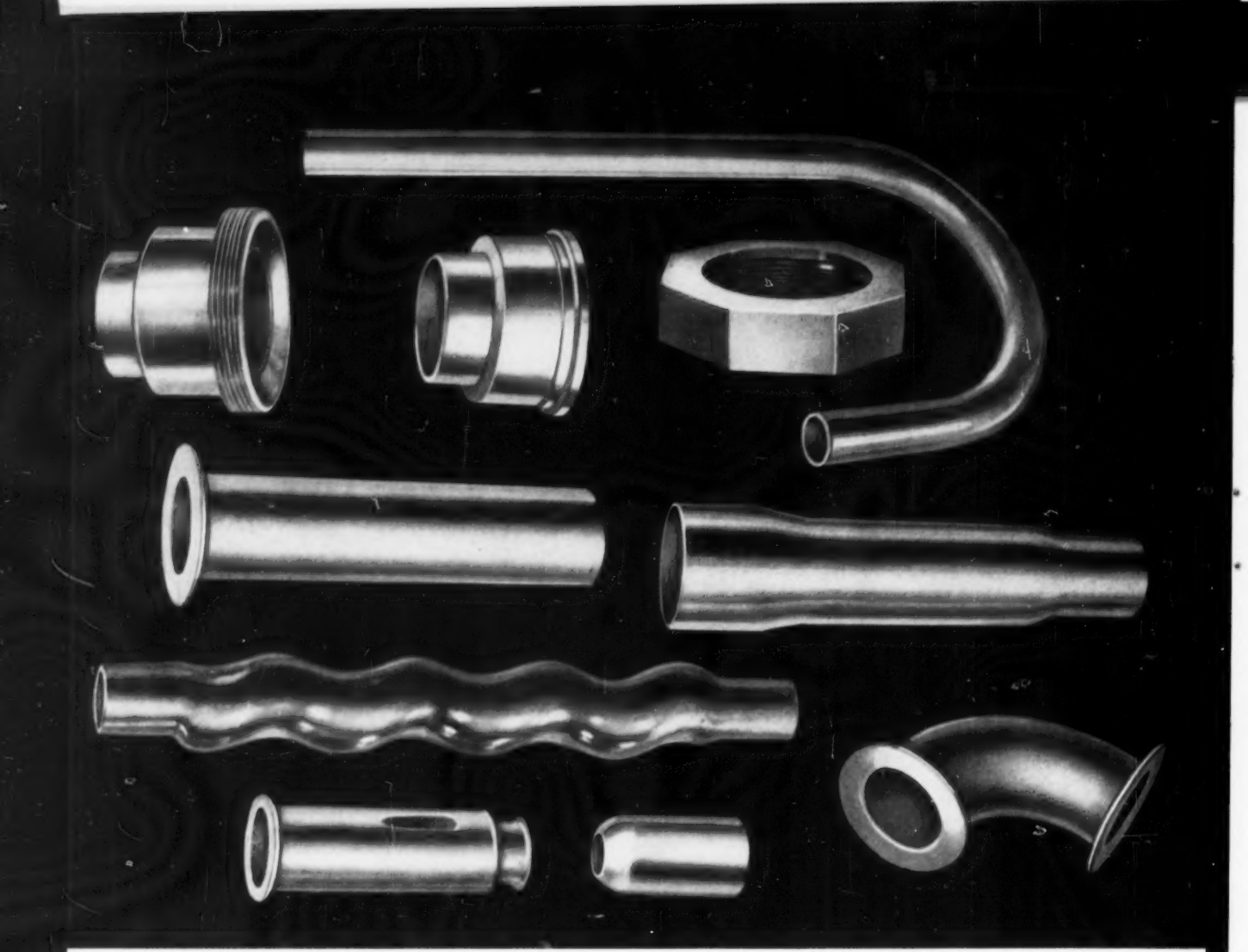

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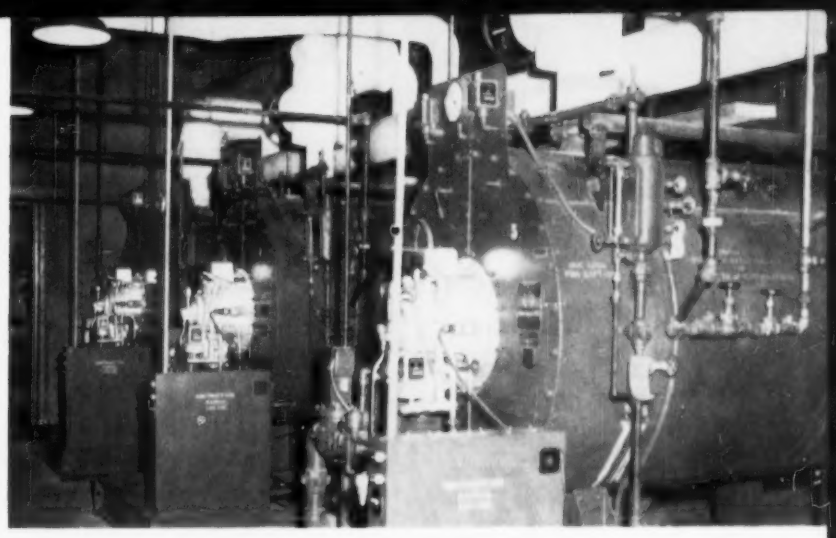

THIS BATTERY of three new boilers assures Focke highest performance with lowest attention. Flipping of switches (in cabinets at right of each unit) initiates automatic, proper-sequence control of all steam-making operations.

Tips on Getting a New *Steam* System

Problems and best way to meet them spotlighted by meat processor's experience . . . "Packaged" boilers offer automatic control, clean operation . . . Fuel savings cited

LIKE ANY modern major equipment, a new boiler system runs into considerable money. And that's why the greatest of care should be exercised in planning, selecting, and installing it.

In short, mistakes in such a project can send you mighty high over your budget—so high, in fact, that your whole profit picture may be twisted.

On the other hand, the properly engineered program can even be instrumental in establishing a cost advantage over your competitors.

Your No. 1 question, of course, is, "How much steam do we need?"

In the case of William Focke Sons, Inc., Dayton, Ohio, quite a lot was required, since meat processing is the operation. This meant steam to service jacketed kettles, rendering tanks, blood evaporators, and cookers, plus normal plant heating and hot water needs.

Replacement of this company's steam-producing plant was specifically prompted by booming production, plus the need for new flexibility. Here, the management wisely figured it was a problem calling for the attention of expert heating engineers.

Passes All Tests

Decision reached was to install three 80-hp. Powermaster boilers (Orr & Sembower, Inc., Reading, Pa.). This new equipment was planned to fill these three basic needs:

1. Provide reserve capacity to offset the load of starting up a cold plant following week-end shutdowns.
2. Possess extra punch to maintain steam pressure against the high condensation rate in cold equipment and radiators.
3. Furnish enough steam to cover the increasing use of meat processing equipment.

Midweek load at this plant can run to a high 8,100 lb./hr. of steam—but the three units installed have a rated capacity of 8,280, hence they've readily answered the need.

Further, the new equipment has brought the following added advantages:

• **With the new automatic, gas-fired operation no full-time fireman is required, and the maintenance men need only make periodic inspections.**

• **Pre-tested controls direct every phase.** The combustion regulator first automatically clears the chamber. Then it controls the ignition and also supply of fuel. A modulating control maintains a balanced proportion of air and fuel. And supply of water to the boiler is automatically regulated. Further, an electronic unit governs both main and pilot flames.

• **Change of these units to oil-burning is handily accomplished with just the push of a few buttons.**

Then, too, this initial advantage must be noted:

• **Installation costs were substantially lower.** This was because the maker completely assembles these boilers and fire-tests them at the factory. Thus, the units need only be hooked up for fuel, water, and power. Moreover, actual installation is simplified by designed features to facilitate hoisting. And a self-contained base eliminates the need for costly foundations.

The former coal-fed units required week-end banking, with attendant waste of fuel. In contrast, the new units merely require starting about an hour before the working period begins. And one or two of the three can be cut out when steam requirements drop.

As for cleaning and inspection, these tasks are convenient, since there's full access to combustion chamber and boiler tubes. And here, the old smoke stack and soot are eliminated, this being a gas-fuel operation.

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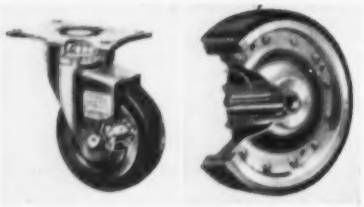

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RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

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PAINT *STOPS* MOLD

It has lasting protective action . . . Saves on sanitation . . . Cuts maintenance bills

NOW WEDGING into the U.S. market is a special paint that has been doing a most effective job in keeping walls and ceilings of European food plants free of mold.

Primarily, it's been employed in areas subject to high humidity—such as dough proofing rooms, fruit ripening chambers, wine storage facilities, and cheese aging warehouses.

However, use of this non-toxic vinyl latex coating (called Fungi-Chek) is seen pertinent in any food processing or storage area. Thus, incidence of spoilage organisms would be further minimized and more certain control of various food operations assured.

This covering is applied with brush, spray, or roller, and it dries to a flat finish. It's said to destroy microorganisms as they come to rest on the painted surface. Moreover, the anti-fungal and anti-bacterial properties are reported to continue for the life of the paint film, which is said to withstand repeated washings without impairment of action.

As for the product's non-toxicity, this is stated to have been established by tests with guinea pigs at Duke University. These animals showed no adverse effects when they were fed large doses of the paint.

Down to Cases

Overseas experience with the coating runs back more than 5 yr. And in this time a number of instances of successful application have been cited.

When the 1953 floods created excessive dampness at Van den Berghs & Jergens, English margarine maker, repainting with Dentolite (British name for the paint) was specified. Both production and storage areas were covered. Result: No trouble with mold.

Similar success has been reported following use of the coating in the bacon storage department of Co-operative Society, Ltd., London. And the paint has also been hailed at the London Pepsi-Cola plant, where it quickly cleared up an area particularly vulnerable to mold.

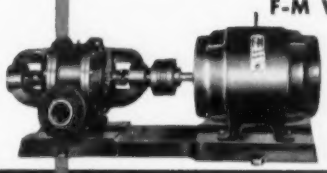
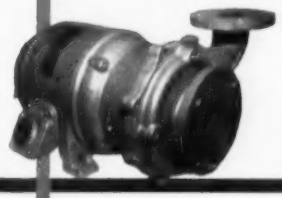
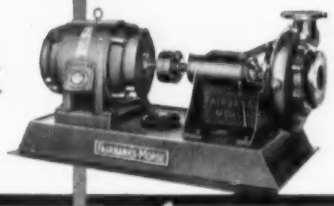
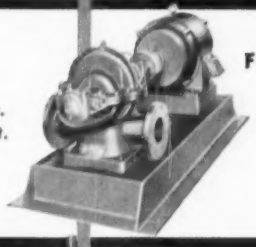
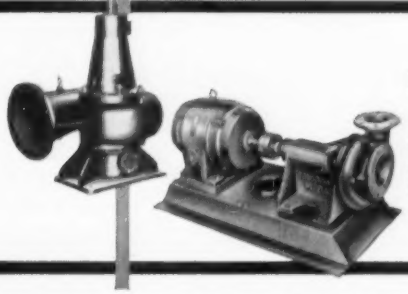
Further evidence of the paint's effectiveness can be seen in our photo (below) of a ceiling test panel. This shot was taken in a bakery fermentation room six months after the material was applied. Note that the painted portion is free of mold, while surrounding untreated areas are heavily contaminated.

Growing American interest in various food branches is borne out by this partial list of U. S. companies using the coating: Hahn Cheese Plant, Enosburg Falls, Vt.; Taylor Wine Co., Hammondsport, N. Y.; Gordon Baking Co., New York City; and Standard Brands (yeast plant), Peekskill, N. Y.

Offered in most colors, the paint is now being sold here by Charles Bowman & Co., New York City.—*End*

THIS CHECK-PHOTO of ceiling test panel in bakery fermentation room offers striking proof of coating's performance. Snapped 6 mo. after application, it shows painted portion has remained clear, whereas untreated surrounding areas are fouled with mold. Before adopting the paint, bakery redecorated several times yearly.

Guide to better pump selection

for		specify
boiler feed condensate return hot and cold liquids chemicals refrigerants, etc.	up to 200 gpm. pressures to 900 ft.	 **F-M WESTCO PERIPHERAL PUMPS** High pressure at normal operating speeds. Handle widely varying heads with little change in capacity. Sizes 1¼" through 2½".
hot and cold liquids liquid circulation nonviscous liquids boiler feed cooling towers, etc.	up to 900 gpm. pressures to 525 ft.	 **F-M BUILTOGETHER CENTRIFUGAL PUMPS** General-purpose, close-coupled pump and motor units mount in any position—horizontal, vertical or angular. Sizes ¾" through 5".
sewage slurries paper stock fruit shrimp vegetables, etc.	up to 30,000 gpm. pressures to 175 ft.	 **F-M NON-CLOG PUMPS** Unexcelled for clog-free handling of liquids with solids in suspension. Sizes 2" through 20". Vertical or horizontal. Bladeless or conventional.
water supply plant service booster circulating air conditioning refrigeration chemical liquids boiler feeds, etc.	up to 50,000 gpm. pressures to 700 ft.	 **F-M SPLIT-CASE CENTRIFUGAL PUMPS** High, sustained efficiency over wide range of conditions. Low-cost maintenance. Sizes 1½" through 36". Single stage or multistage.
hot and cold liquids chemicals circulating liquids nonviscous liquids cooling towers condenser circulation, etc.	up to 100,000 gpm. pressures to 250 ft.	 **F-M END-SUCTION PUMPS** A wide line of rugged, precision-built pumps. Sizes ¾" through 54". Horizontal or vertical centrifugal.

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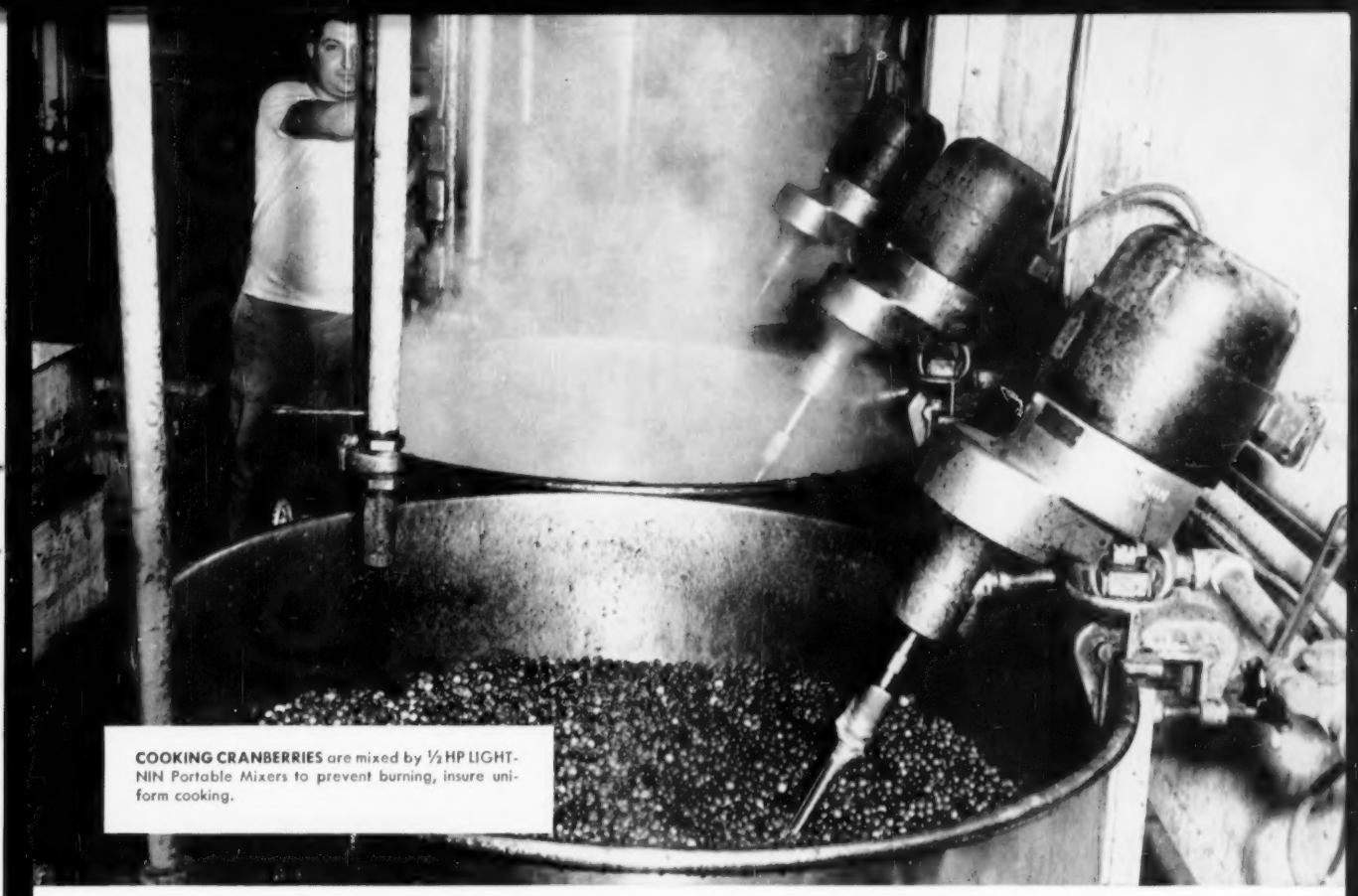

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- ☐ Quick-change rotary mechanical seals for pressure and vacuum mixing (B-111)
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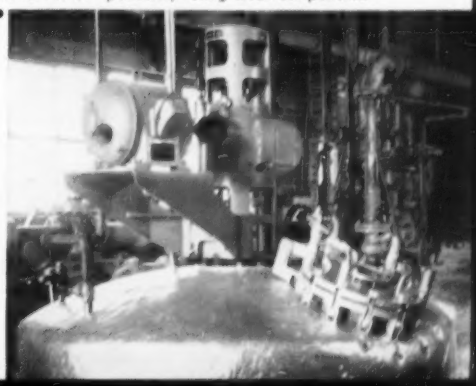
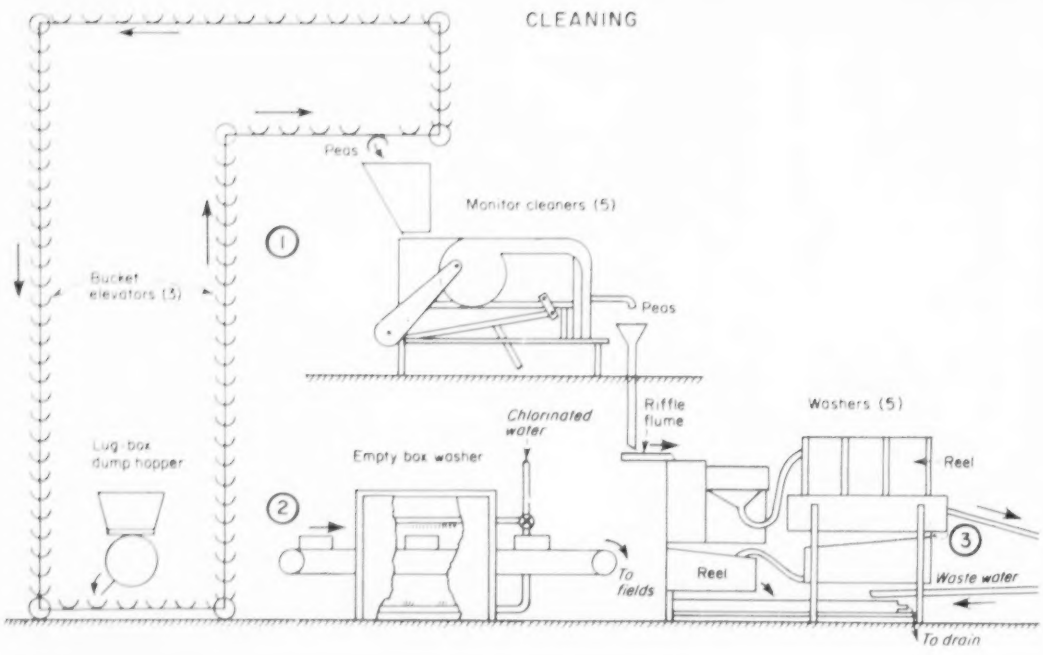
In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 10, Ont.





Canning and Freezing—For Quality

Libby does it with special advanced equipment and a widespread network of strategically spotted instrument control facilities

CONTINUOUS FLOW . . . advanced processing units . . . instrument control—all play a key role in the production of uniform quality canned and frozen peas at the new Wallaceburg, Ontario plant of Libby McNeil & Libby. (See accompanying flowsheet.)

Processing begins with receipt of pre-tested peas in 30-lb. lug boxes, which are dumped into hoppers feeding bucket-type elevators that carry them to five monitor cleaners—see Point (1). Meanwhile, empty boxes are conveyed through specially built, high-pressure spray washer—Point (2).

Flow of peas into processing lines is remotely controlled from a central instrument panel located near 1st-floor blanchers and filling machines.

From the cleaners, peas are flumed to five Hi Eff (Scott Viner) reel-type washers—Point (3). Here, the

FOR THE STORY behind this flowsheet, see p. 88

flow branches. In one case, an hydraulic elevator conveys peas (for frozen pack) to a froth-floatation cleaner (Key)—Point (4). Another hydraulic elevator feeds to a tubular blancher, that discharges to a shaker screen and still another hydro-elevator that conveys them to 2nd-floor shaker screens and quality graders.

Remaining peas from washers ultimately end up in cans. Peas from two lines are conveyed hydraulically to shaker screens ahead of continuous FMC blanchers with dual temperature controls—Point (5). From here, they are chuted, in succession, to shaker screens and hydraulic elevators—Point (6)—that lift them to shaker screens ahead of five quality graders.

Temperature of blanchers, and density of brine that is continuously recirculated through graders, is recorded and controlled from central panel board.

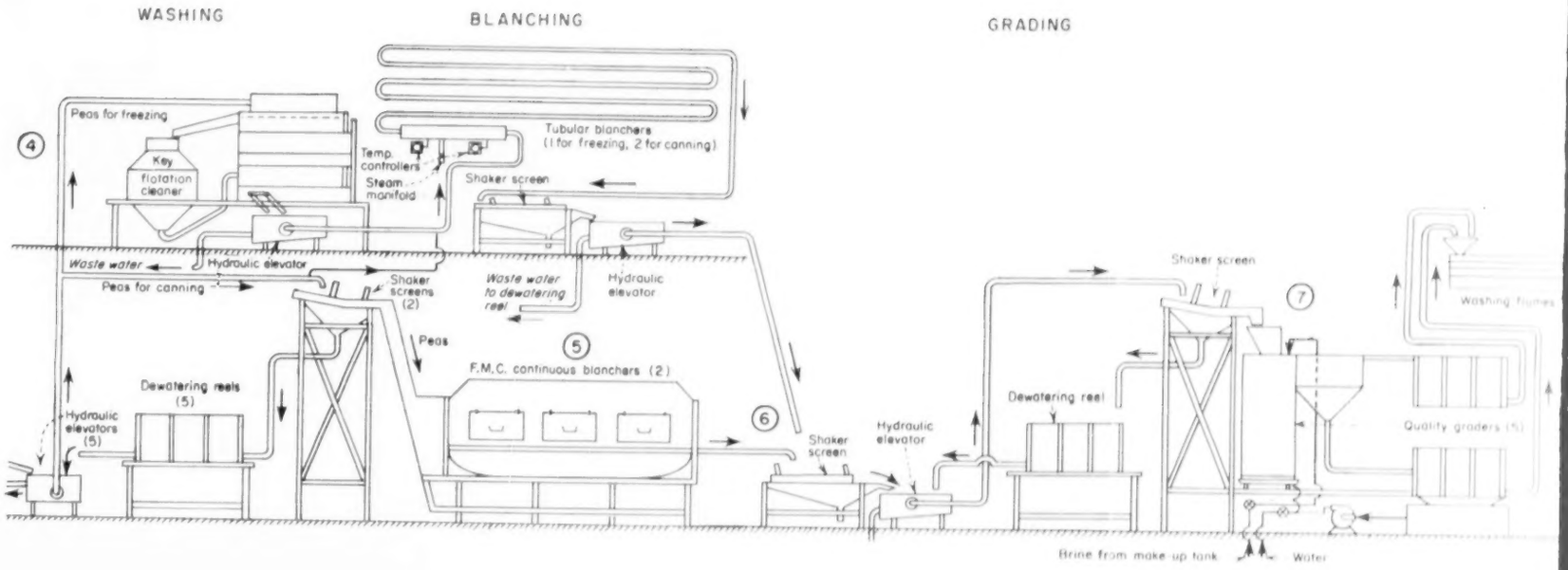
Graded peas are flumed to shaker screens ahead of seven inspection conveyors—Point (8)—then to shaker screens above filling-machine hoppers. Peas for the frozen pack are flumed in pre-chilled (37-40 F.) water to two carton-filling lines—Point (9).

Hoppers of these units are equipped with level indicators, and their fill is controlled from 2nd-floor panel.

Cartons are automatically set up by Kliklok forming machines, and conveyed (200 per min.) to 15-pocket, rotary volumetric fillers (FMC). Filled packages go to overwrapping machines (Package Machinery), then are put on trays for freezing.

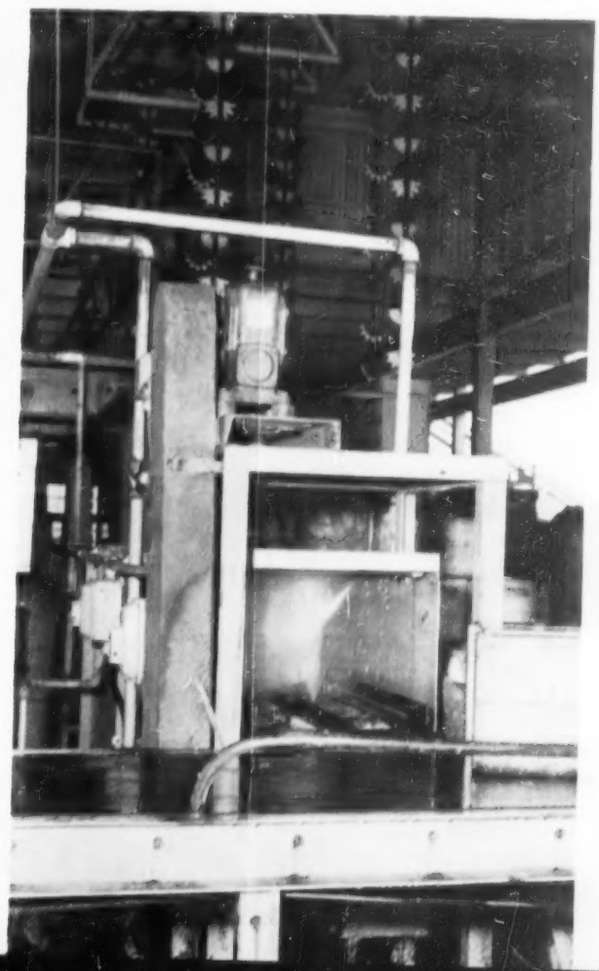
Peas for canning are hopper-fed to four filling and closing machines, where brine is also introduced—Point (10). Cans are either conveyed to two continuous cooker-coolers (Anderson-Barngrover) or placed in crates that are fork-truck transferred to ten pressure retorts.

Canned peas are finally conveyed to the warehouse section where they are labeled, cased (FMC), and the cases glued and sealed (A.B.C.).



1 **LUG BOXES** are dumped into hopper feeding bucket elevator (right) that discharges into monitor cleaners (top).

2 **EMPTY BOXES** are conveyed through high pressure washer that cleans them inside and out with chlorinated water.



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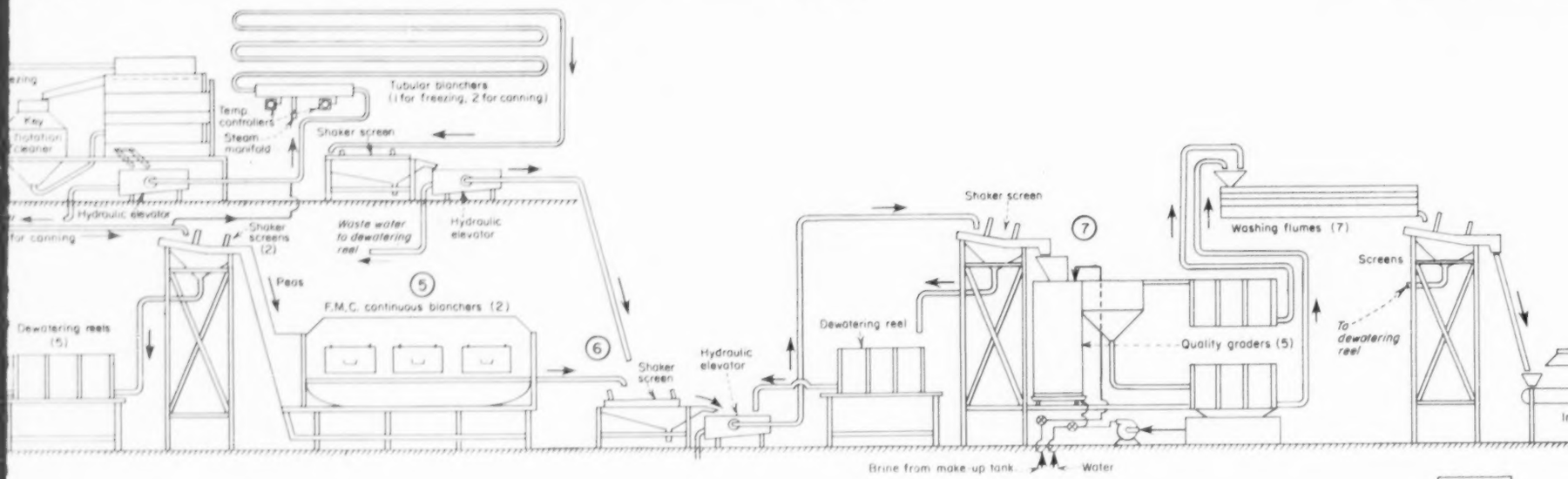
WASHING BLANCHING GRADING WASHING & INSPE



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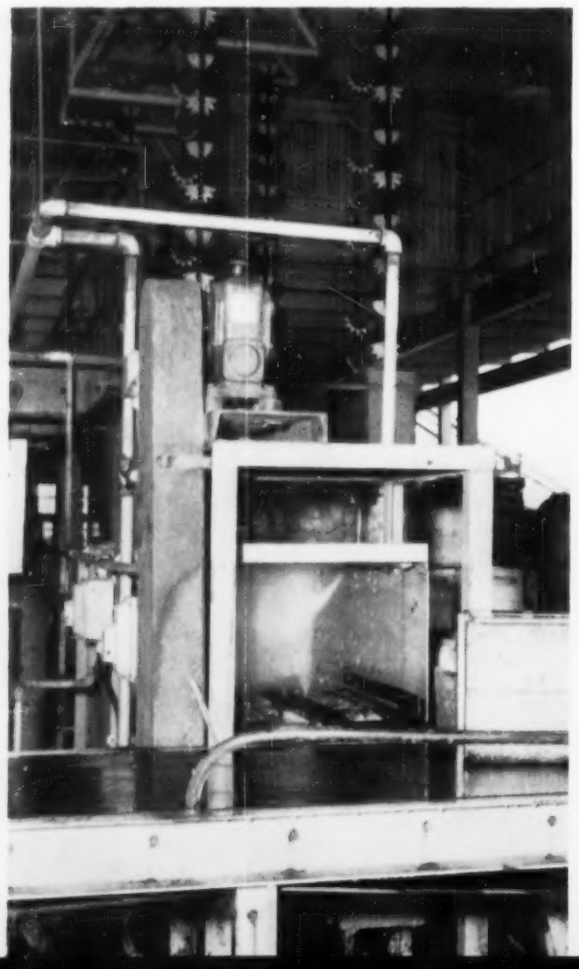
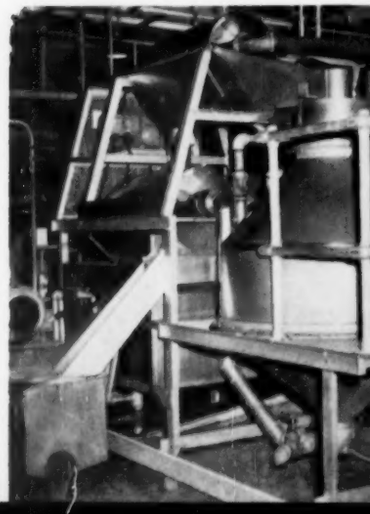
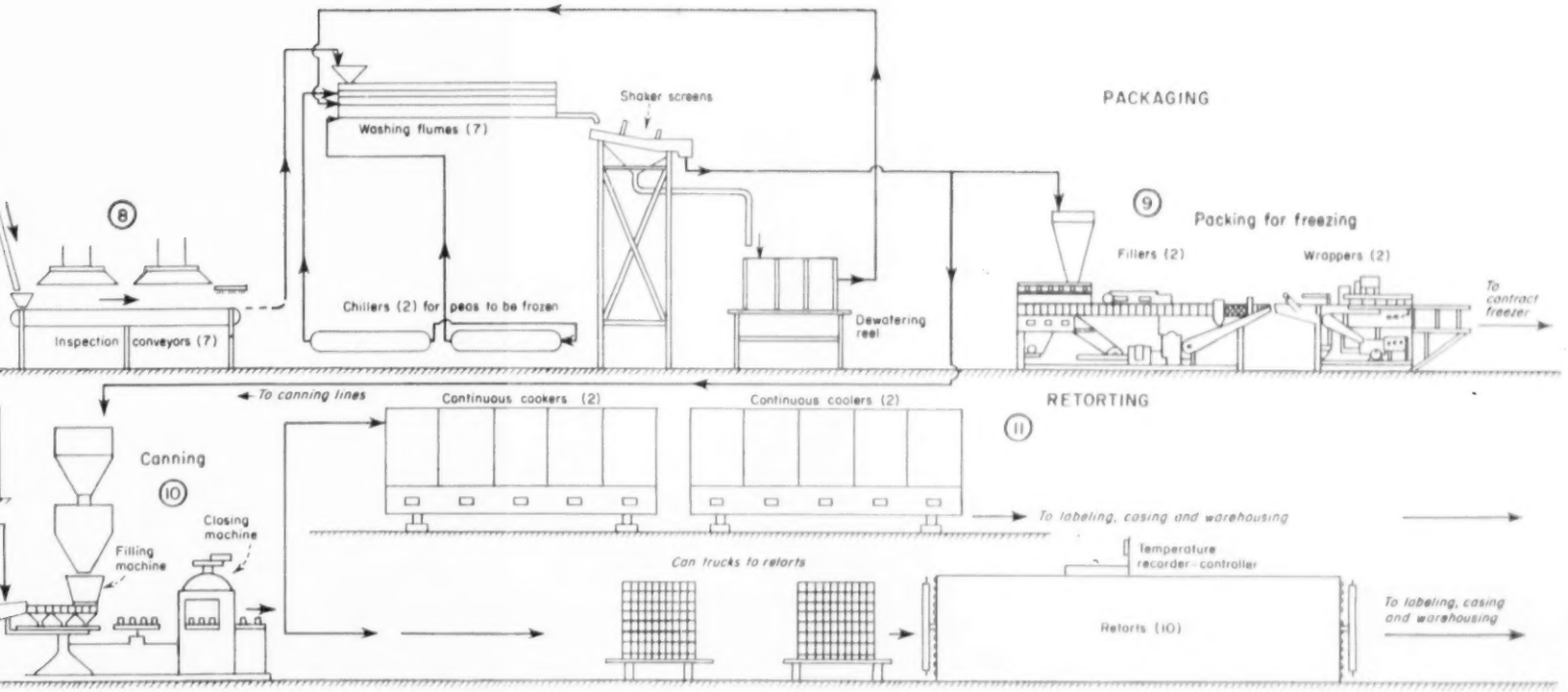


4 **FROTH-FLOTATION CLEANER** preparation of peas for frozen-packs. is removed to speed operation on picking

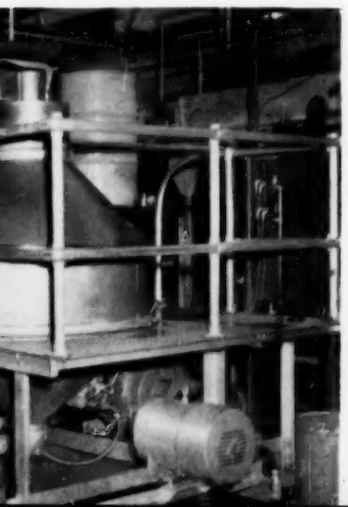


INSPECTING

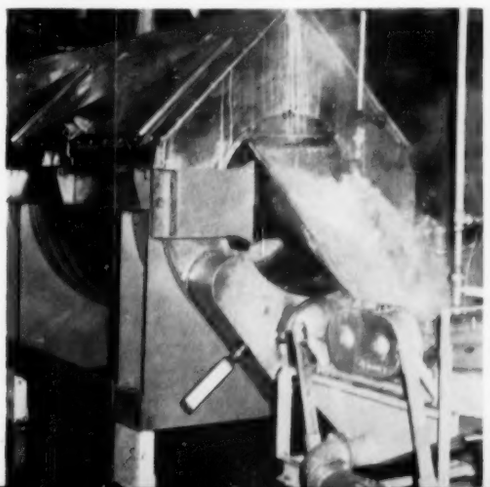
FE PICTURE FLOWSHEET NO. 101



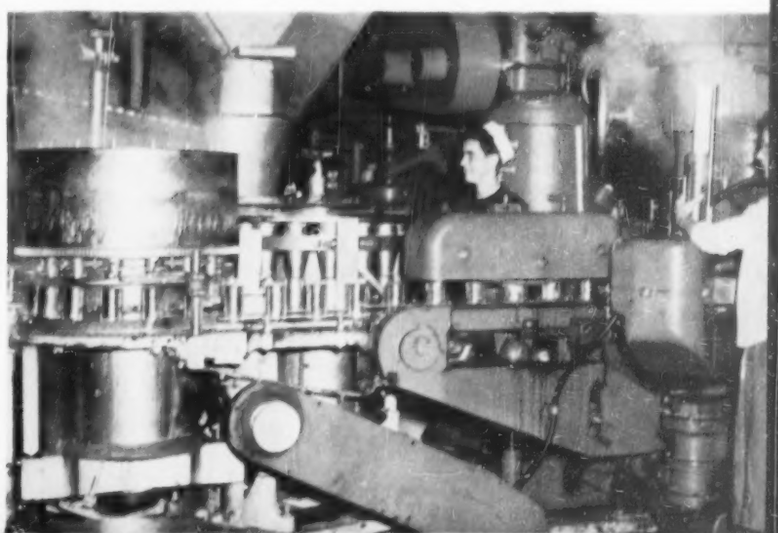
ANER (foreground) is an extra step in packs. Here, additional extraneous matter picking tables.

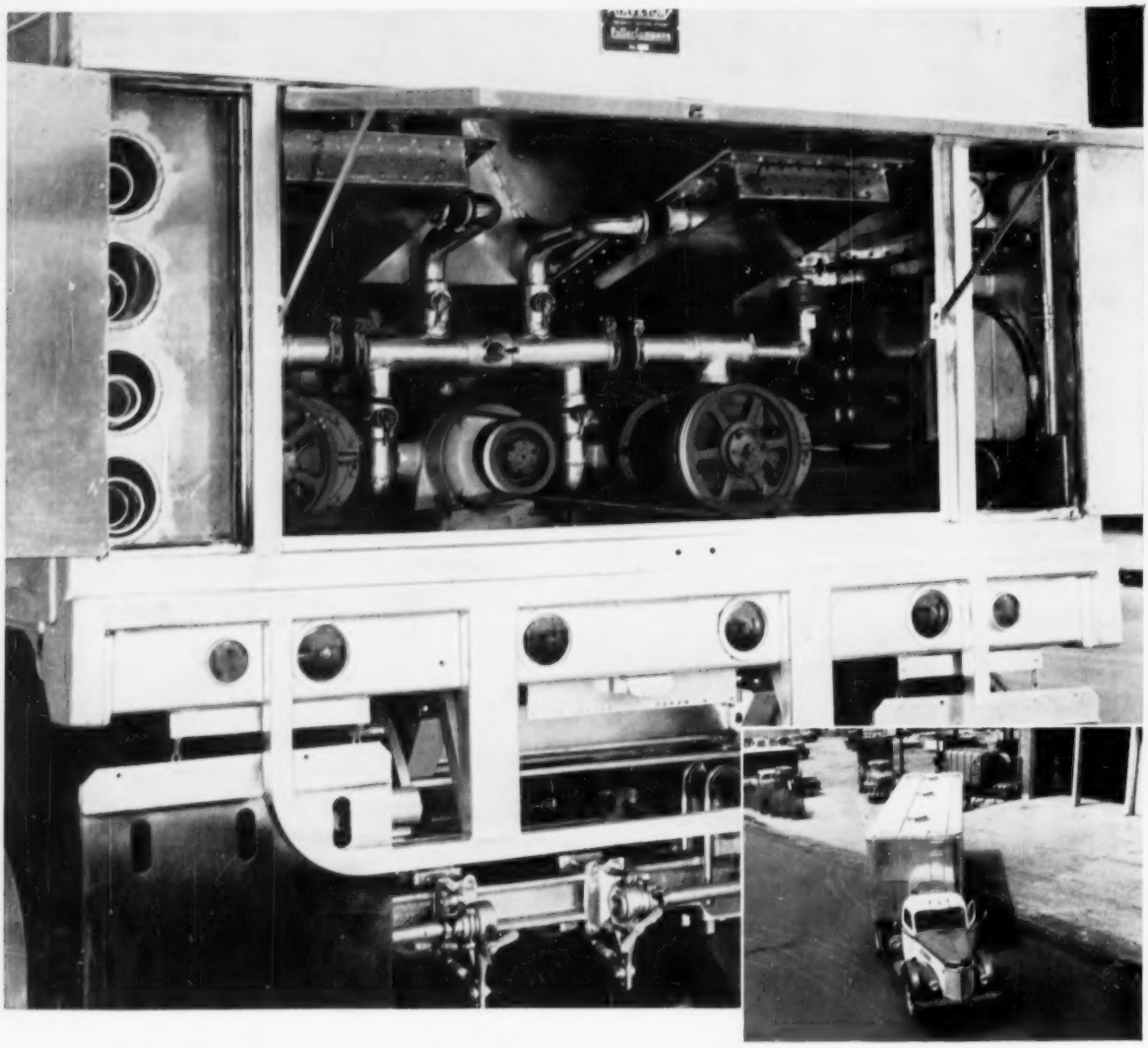


5, 6 **NEW SANITARY BLANCHERS** have dual temperature controls, are designed to provide more uniform blanch. Shaker screen (foreground) remove water from blanched peas.



10 **15-STATION FILLER** operates at up to 300 cans per min. Cans are then brined as they go to closing machine.





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Direct delivery of flour in bulk affords savings of 25¢ and more per hundredweight to commercial bakeries. By converting to pneumatic handling, many progressive bakers gain not only the advantages of bulk purchase, but reduce flour loss due to spillage, use space more efficiently, and virtually eliminate flour contamination.

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These new all-aluminum vans transport 20 tons of flour from the mill to the bakery where the driver unloads it into storage bins in less than an hour.

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7 years' trouble-free service on HCL acid with this Crane diaphragm valve

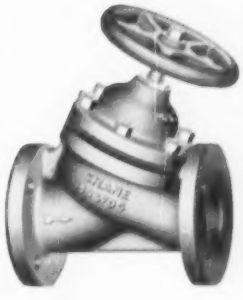
How do Crane diaphragm valves perform on acid services?

This major container manufacturer has impressive proof. Seven years ago, the Crane 4-inch No. 1615-RN rubber-lined diaphragm valve shown above was installed on 17 deg. Baume hydrochloric acid service. The acid is used to clean evaporators and surface condensers. *Not once has this Crane diaphragm valve failed to function—not once has it failed to hold tight.*

Previously, this plant used conventional all-metal valves. These had to be replaced regularly as an expendable material. The Crane valve has eliminated all replacement costs by providing maintenance-free performance—and from all appearances will continue to do so for years to come.

You just don't get service like this from ordinary valves. Crane valves are so expertly designed, have such quality materials and are so carefully machined and tested that cost-free records like this are the rule rather than the exception with Crane users.

Get the facts on Crane diaphragm valves from your local Crane Representative, or write to address below.



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2. They are easier to use because they are standardized as to strength of flavor, color and acidity.

3. Being highly concentrated, they can be stored more easily and at lower cost. Bulkier juices require more space. Furthermore, to avoid spoilage, the latter must be preserved with alcohol which, in turn, reduces available working capital through the necessity of providing cash to cover alcohol tax requirements.

4. Since they are fortified and strengthened with other natural but less costly flavors, they are cheaper in actual use than are the corresponding natural juices.

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TRUE FRUIT BLACKBERRY W.O.N.F. #26888
TRUE FRUIT BLACK RASPBERRY W.O.N.F. #26893
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TRUE FRUIT GRAPE W.O.N.F. #26891
TRUE FRUIT PEACH W.O.N.F. #26886
TRUE FRUIT PINEAPPLE W.O.N.F. #26889
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BASIC RESEARCH . . .
More Practical Than You Think

This editorial, one of a special series on the importance of research to the American economy, deals with an aspect of our research program that may have serious consequences in future years — the lag in basic research.

An earlier editorial in this series noted: "The keen interest of U. S. business firms in scientific research points the way to a new kind of prosperity for our economy — a prosperity based on deliberate creativeness." As a result of the dramatic increase in industry's research expenditures, more new products will be introduced in the years 1957-1960 than in any previous four-year period.

A steady stream of new products and new processes means better values for consumers and lower costs for business. And thus it promises to sustain a high level of general prosperity that defies the old laws of boom and bust. **But, as we look further ahead, there is a danger that the stream of research discoveries may run dry because of our neglect of basic research.**

This danger was described by John Jay Hopkins, late founder and chairman of the General Dynamics Corporation: "Unless there is a revolutionary development in America of pure, not applied, science, there will come a day when there is no use in trading in your old car; because the new one is no better. The only difference between this year's television set and next year's will be the appearance of the cabinet! Scientific progress will be replaced by scientific stagnation."

What Basic Research Is

Basic (or pure) research has been characterized as the pursuit of knowledge for its own sake rather than to fulfill some practical objective. It is generally carried out in an environment which allows the investigator the freedom to follow the lead of his curiosity. The scientist in basic research, in the words of Glenn T. Seaborg of the University of California, is not concerned with "utilitarian goals, but a search for deeper understanding of the universe and the living and inorganic phenomena within it."

Impractical as basic research may seem in its initial purpose, it is an essential prerequisite to applied research and product development. A few examples will show how some of the greatest technical advances of recent years have come from basic research projects that had no immediate practical objective:

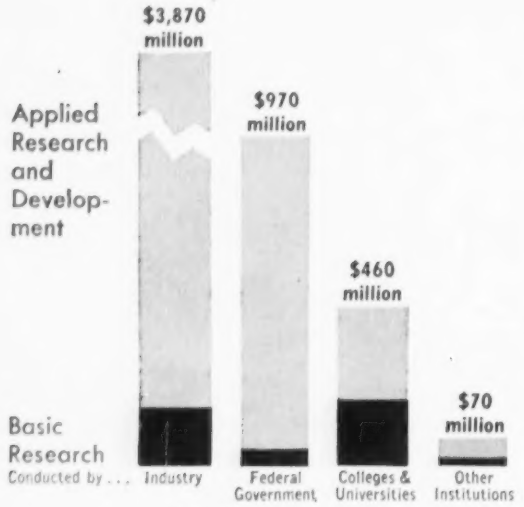
- **Radar** — an important military development of World War II with broadening commercial applications — was the outgrowth of a basic research project whose purpose was to obtain information about the height of the ionosphere, the layer of air that lies some 25 miles above the earth's surface.

- **Transistors** — the miniature devices which are already vital components of hearing aids, pocket radios and a wide variety of industrial equipment — were invented at Bell Laboratories (research subsidiary of the American Telegraph and Telephone Company) following university investigations into the electrical behavior of solids.

- **Neoprene** — a synthetic rubber — was developed by duPont with the help of basic information provided by Father Nieuwland of Notre Dame, who discovered he could control the polymerization (the linking together of molecules) of a certain class of organic compounds.

- **Nylon** — the first of the noncellulosic synthetic fibers that have revolutionized the textile industry — grew out of fundamental research by Dr. Wallace Carothers on long-chain polymers.

Only 8% of All Research and Development in the U. S. is Devoted to Basic Research



Data: National Science Foundation, "Funds for Basic Research in the United States, 1953"

Industry's Stake in Basic Research

Industry traditionally has relied upon colleges and universities and other nonprofit institutions for basic research; and the U. S. has long benefited from the greater emphasis placed on basic research in Europe. It is conventional to think that business cannot, and should not, do much about "ivory tower" projects which do not have immediate practical application.

However, there is not so much in this idea as is supposed. The examples above illustrate what Caryl Haskins, president of the Carnegie Institution, has called "the widespread paradox that the most important practical consequences are commonly the least sought after." Furthermore, it is certain that, without adequate basic research, industry's efforts to produce new and better products will become progressively more difficult. And our national defense, in an age of breathtaking military applications of science, will become increasingly precarious.

In the past, our economic growth came largely through expansion into new lands or through discovery and development of rich deposits of natural resources. Such opportunities are relatively limited today. The great opportunities now lie in discovering new materials and new properties of the materials we already have. **This is the job of basic research, and industry has a vital stake in it.**

The chart indicates the tiny share of research efforts in the U.S. that is devoted to basic research. **Only 4% of all research by industry, and only 8% of all research in the U.S., during the year 1953** (the latest for which information is available) **represented fundamental research to add to overall scientific knowledge.** Even in colleges and universities less than half the research performed is basic research. At least one Nobel Prize winner has expressed the belief that we need and should work toward a doubling of the proportion of our total research effort that is devoted to basic research as soon as possible.

What Business Can Do

Without anything like a staggering increase in the total cost of its research programs, industry could do much to expand our basic research effort. Companies with big research programs should, as a matter of successful survival, be devoting a share of the effort in their own laboratories to basic research. Significantly, companies that are already doing a notable job of basic research have also made an outstanding record of translating such research into new products for industry and the consumer.

Smaller companies may rightly regard the conduct of research projects with uncertain prospects of reward as a luxury. Some basic research, indeed, never results in any tangible payoff. But, with modest contributions, small companies can still have a part in the advance of basic research. They can join together with other companies on cooperative projects. They can support basic research through trade associations and technical societies. They can help research centers in universities and other nonprofit institutions. Arrangements are available in some instances whereby business firms can pay a fee to have access to work done by university researchers.

One way or another, it is up to private business firms to see that basic research moves forward. By doing so they will be laying the groundwork for the development of the new products and technology on which their growth, and the growth of the economy, depend.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

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PRESIDENT

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More than just instruments . . .

Honeywell service begins when you first decide you need instruments, and continues long after your instruments are paid for. First, the Honeywell field engineer goes into a huddle with your own engineers and production men, and makes a complete rundown on what is to be measured or controlled, to what accuracy, under what conditions. Then he goes to work with Honeywell application engineers who have first-hand experience in your industry and processes.

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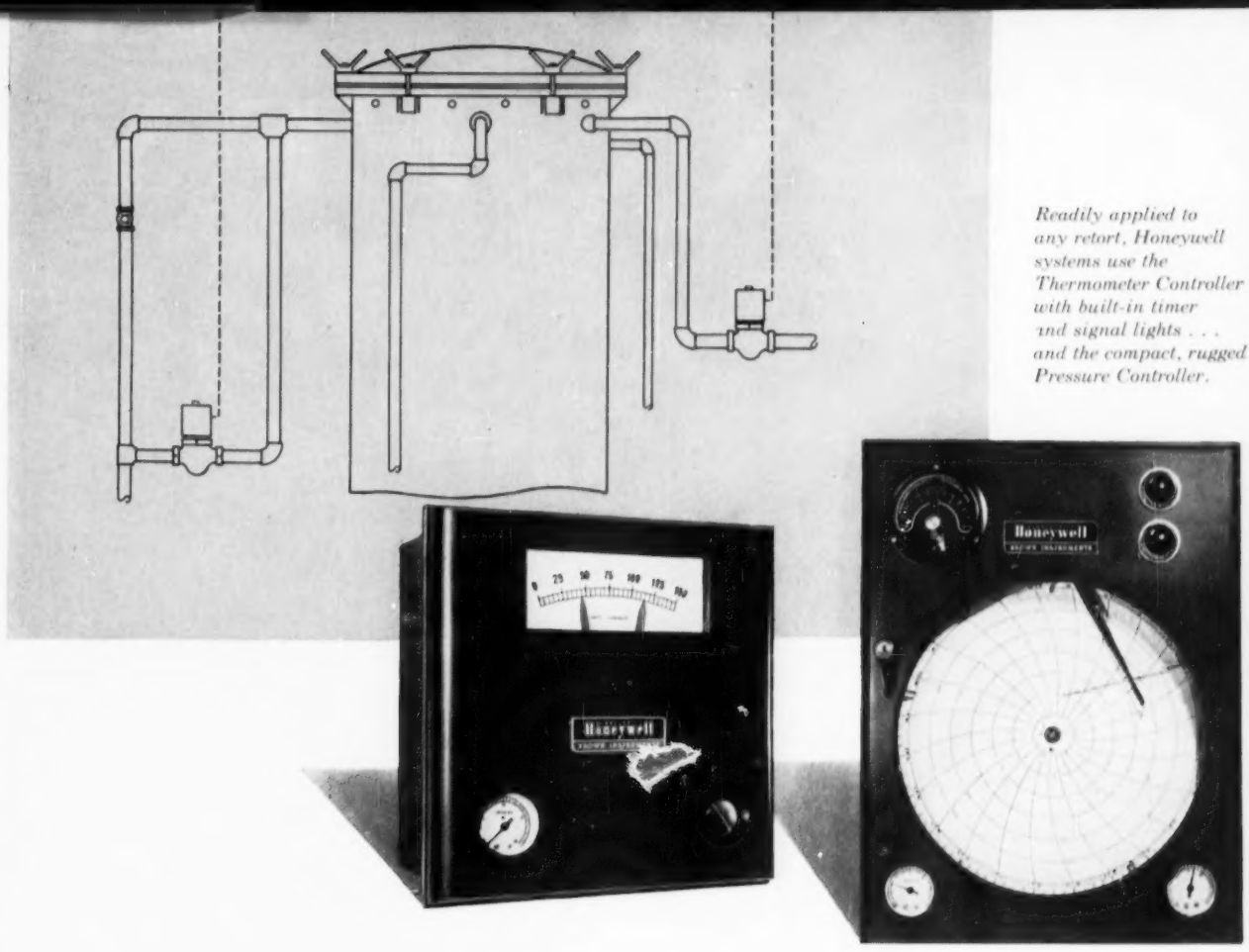
Honeywell help in emergencies is swift. But many emergencies can be prevented with periodic service. Under a simple agreement, a Honeywell service man will visit your plant at regular intervals to inspect, clean, and adjust your instruments and controls.

Want to maintain your own instruments? Honeywell's tuition-free training school teaches your instrument technicians how. Intensive courses range from two to fourteen weeks, and are repeated several times a year.

Honeywell offers far more than instruments. It offers unparalleled service that begins when you call a Honeywell field engineer. He's as near as your phone.

Your retorts can "go automatic" . . . . . with

● **REFERENCE DATA:** Write for Bulletin B-32, "Instrumentation for the Canning Industry."



Readily applied to any retort, Honeywell systems use the Thermometer Controller with built-in timer and signal lights . . . and the compact, rugged Pressure Controller.

Honeywell control systems

IT'S EASY to put a big dent in production costs, when you add Honeywell control systems to your vertical retorts.

These packaged control systems allow you to use your retorts and manpower to the best advantage. Once you have set the cooking cycle you want, the instruments take over. They bring your retorts up to process temperature quickly, hold them there accurately for the specified time, then immediately start the cooling action. No more wasted time and motion . . . no more costly over-processing . . . no more guesswork in your retorting operation.

Yet, the first cost is low, and can be quickly repaid by the savings the systems make possible. The systems can be installed by your plant electrician. Or, even easier, you can order Honeywell-engineered panelboards, wired and piped at the factory, or unmounted . . . at your option. And you can change your control system by merely adding minor accessories, because these systems are built around the same basic instrument and use standard components.

There are systems to fit any retort and every process: —systems which automatically control steam or water cooking—systems with automatic venting . . . automatic blowdown . . . pressure cooling . . . or combinations of these. Cycles can be set for any cooking time from a few minutes to three hours. The automatic venting system, based on minimum time and temperature, conforms to the recommendations of the Research Laboratory of the National Canners' Association.

Find out how Honeywell controls can go to work on your canning problems. Just call your local Honeywell field engineer . . . he's as near as your phone.

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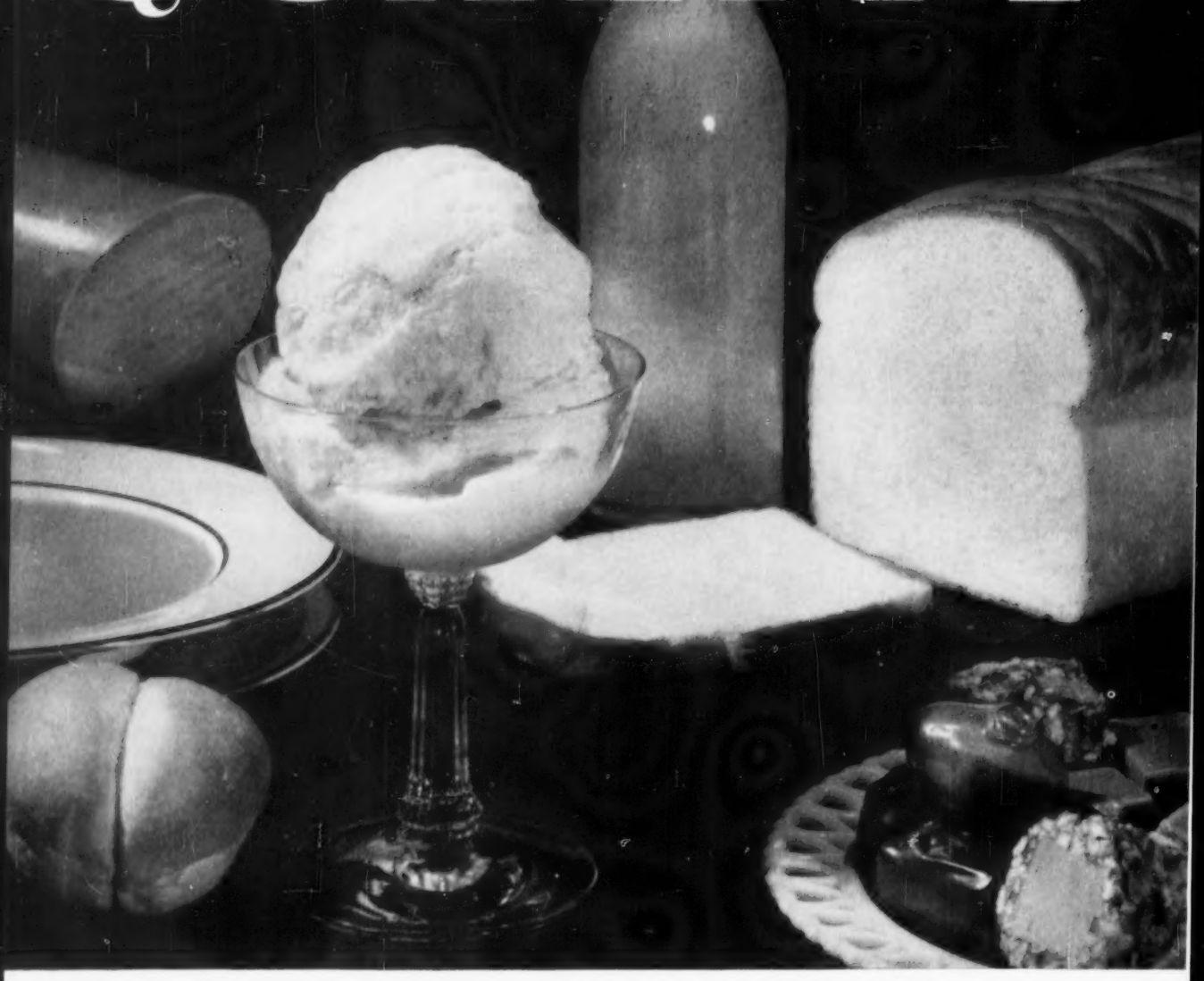

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Ups Milk Shelf-Life

Milk that will keep at least 25 days in the consumer's refrigerator is reported to be achieved with ultra-high-temperature pasteurization.

The process is described by O. W. Kaufmann, Michigan State U. researcher, who says it can also help dairies increase processing efficiency and reduce spoilage losses.

U-h-t differs from conventional methods in that the temperature used ranges from about 190 to 280F.

"Smell Scale" Nearer

Now under development is a "smell scale" that may help you tell exactly how much of an ingredient is needed to enhance taste or odor of a product. Seeking the new scale is Dr. F. N. Jones, psychologist at U. of California. Subjects sniff a substance in bottle at a vapor pressure established as standard. Then as amounts of substance are varied, they estimate intensity of the odor.

New Gage for Paper

Processors who want to specify the smoothness or roughness of finish on multiwall bags are now able to get a new test procedure, developed by the Packaging Institute, New York City, that will arm them with a suitable tolerance to pass on to their suppliers.

The measuring technique, which involves passing an air current over the paper material in a special instrument, is fast and can be gaged electrically to eliminate human error.

New Plus for Wheat Foods

Enriching wheat foods with such man-made amino acids as lysine may be solution to world protein hunger, says du Pont nutritionist, Dr. N. W. Flodin.

Addition of ¼ lb. of this essential "building block" to 100 lb. of flour will convert the "low efficiency" protein found therein to a "high efficiency" element similar to that in meat or milk.

Bread and other cereal foods currently supply 20 to 40% of the protein consumed by individuals in underprivileged groups, the scientist states.

4-Firm Group Maps Radiation Center; Halt on Big Reactor Delays Vital Data

Contract to plan facilities for the Army's new Ionizing Radiation Center, to be built at Sharpe General Depot, Lathrop, Calif., has been awarded to Irradiated Products, Inc., New York City.

IPI was formed in a four-company cooperative move by Armour, General Foods, Continental Can Co., and Food Machinery & Chemical Corp. Purpose is to undertake the first pilot plant for food irradiation.

Production planning for the Center, on which construction is expected in '58, will include development of plant plans, space allocations for functions, work-flow diagrams, production methods, and cost studies.

The Center will consist primarily of a food processing plant utilizing an electron accelerator (to be built by Varian) and a gamma ray source (design now undecided).

Operations will be directed by QM Research & Engineering Command, with Center personnel seen numbering 250 by the second year.

A joint statement by the firms forming IPI hails food irradiation's "significant possibilities, not only for the Armed Forces but for the civilian population as well." And it declares it important to national interest that "use of radiation in handling, processing, packaging, and protecting foods be developed as rapidly as possible," with the findings "made publicly available."

Major benefits seen for radiation are reduced food losses, less refrigerating needs, better control of certain food-borne diseases, and wider availability of fresh foods.

IPI officers are: President, Udell C. Young (v.-p., General Foods); Vice-President, Victor Conquest (v.-p., Armour); Secretary, Arno M. Wiese (asst. to v.-p., General Foods); and Treasurer, John N. Carty (asst. treas., Continental Can).

Snag Over Gamma-Ray Reactor

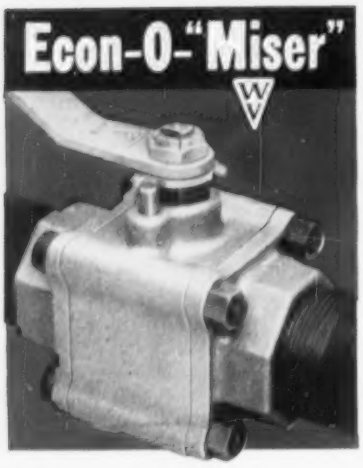
Earlier, AEC halted development of the 15-megawatt gamma-ray reactor initially proposed for the Center. Blamed for the stop-order are military research budget cuts, with officials conceding that the big reason was Budget Bureau's refusal to release the $3 million Congress had provided for the reactor.

Plan was that the major gamma-ray unit, using indium-sulfate irradiation, would treat 1,000 tons of food monthly—matching the capacity of the electron unit projected by Varian. Thus, commercially valid cost comparisons could be made.

Still later word has it that the Army might cut the food-treating capacity to 500 tons a month.

New Chocolate Tankers

Elimination of molding, packaging, and handling steps in shipment of bulk chocolate are said to be the biggest advantages for two, new liquid-chocolate tank cars that now shuttle between D. L. Clark Co., Pittsburgh, and General Foods Co., Dorchester, Mass. The 100,000-lb.-capacity carriers are connected to temperature controlled storage tanks at loading and unloading points.



Worcester's New Econ-O-"Miser" Ball Valve* is BOTH

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The costs of a union and installing it are eliminated. Add to this the longer operating life of the Econ-O-"Miser", the time and materials savings of *in-line maintenance*, and you get performance unmatched by *any* valve at *any* price.

The Econ-O-Miser" is available in Bronze, Aluminum, Aluminum Bronze, Forged Carbon Steel, types 303 and 316 Stainless Steel. Seat and seal materials available: Teflon, Buna-N and Neoprene (others available on request.)

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Better, Handier Fare for Pilots in Pressure Suits

Eating inside your suit becomes a must—when it's the kind of suit that seals you in under pressure for jet piloting at a rare-air altitude.

So Air Force researchers are busy working out more suitable foods and handier feeding means for such cramped-space eating.

Prospects now look good for intake of foods by squeezing them from tubes, like toothpaste. Being tested is a system of supplying nourishment via a pipe passing through, or fastened to, an air-tight aperture in the flyer's helmet.

Foods considered are chicken, turkey, and beef in solid-stock form, to be carried into the pilot's mouth by a device operating like a woman's lipstick dispenser—twist the end and the stick moves out of the tube.

Also studied are liquid meat of "thick-malted" consistency. They could be "tube-served" by gravity. Even a squeezable semi-solid form of ham-and-cheese-on-rye is envisioned.

The progress toward better altitude eating was highlighted by Lt. Col. W. D. Nettles, of the Air Force and QM, at the recent meeting of the Assn. of Military Surgeons. He further implied that the studies might one day have a bearing on space-flight feeding.

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and the Food & Drug Administration (FDA) on U. S. Standards and on allowable tolerances of various presticides on raw agricultural commodities.

References below are to the *Federal Register*.

Shell eggs, AMS notice of amendment of U. S. Standards, F. R., Oct. 16, p. 8167.

Poultry, AMS notice of amendment of U. S. standards, F. R., Oct. 16, p. 8168.

Lemonade, frozen concentrate, AMS notice of proposed revised standards, F. R., October 30, p. 8741.

Corn-on-the-cob, frozen, AMS notice of revised standards, F. R., Nov. 5, p. 8876.

Potatoes, AMS notice of proposed revised standards, F. R., Nov. 8, p. 8984.

On cottonseed, asparagus, potatoes, sugar beets & tops, apples, grapes, pears and pineapples, tolerances of sodium 2,2-dichloropropionate, F. R., Oct. 19, p. 8261.

On celery, tomatoes & potatoes, tolerances of 2,4-dichloro-6-(0-chloroanilino)-triazine, F. R., Oct. 24, p. 8361.

On certain grains, fruits, vegetables, berries, citrus fruits, nuts, eggs & meats, tolerances of Malathion, F. R., Oct. 31, p. 8777.

On certain fruits, vegetables, berries, citrus fruits & nuts, tolerances of Captan, F. R., Nov. 1, p. 8822.

On milk, tolerances of Malathion, F. R., Nov. 9, p. 9005.

Frozen concentrates for lemonade, standards of identity, notice of further extension of time for filing briefs, F. R., Nov. 13, p. 9037.

Announces High-Speed Vender

Holding a total of 54 pre-heated cans, a new vending machine for the food service industry will pop out ready-to-serve cans of soup in only 20 sec. Unit is made by LeBron, Inc., Omaha.

Briefly

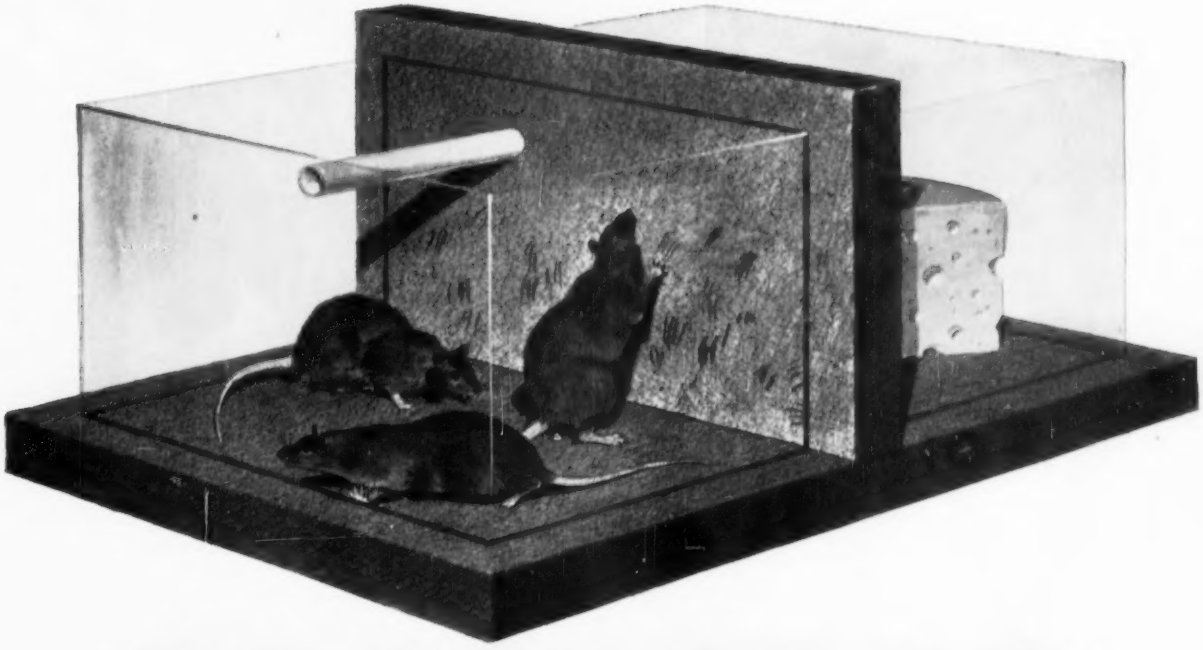
• WINE AGING SPEED-UP is goal of new research at U. of Calif., Davis. State's Wine Advisory Board initiated $10,000-grant study as vintners' trend to use of larger tanks has tended to slow maturation.

• INSPECTION OF POULTRY products under new law (FE Sept., p. 129) will start in approved plants about May 1, says USDA. Checks on all products moving interstate become mandatory Jan. 1, '59.

•

• 675 COOLING SYSTEMS for RR food cars will be supplied by Carrier Corp. to Pacific Fruit Express Co. Called largest ever awarded, contract runs nearly $2 million.

Rats gnaw right through some insulations . . .



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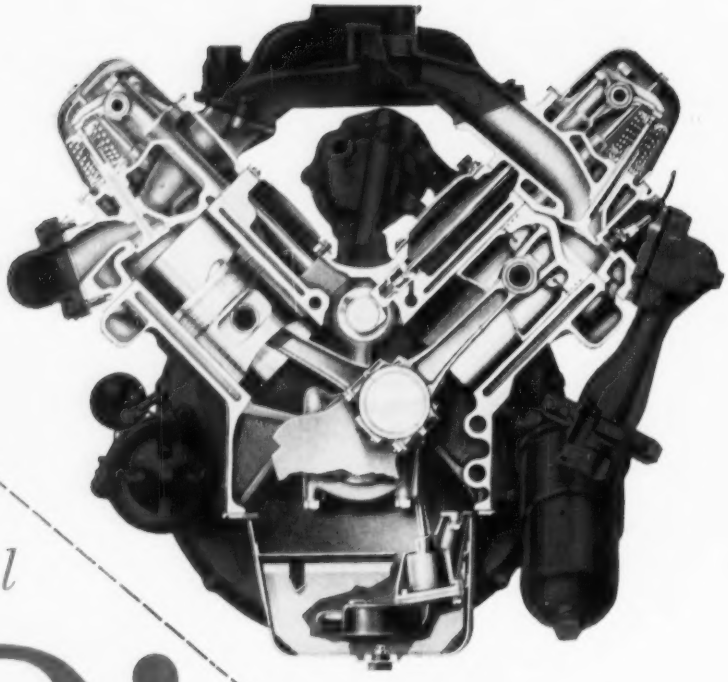

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V-8's

Built to stay on the job longer!

INTERNATIONAL heavy-duty V-8 engines stay on the job long after high stress modified engines have failed to satisfy.

The big difference: INTERNATIONAL V-8's are *built* specifically for rugged, continuous truck operations—and they've proved it since introduction a year ago. Every part, from the heads to the pan, has built-in reserve life. For example: there are exclusive long-life "wet" replaceable exhaust valve guides, fully machined and high efficiency combustion chambers, Y-shaped, deep skirted, rigidly constructed special alloy cylinder block, and many other endurance features that also keep running costs low.

When you buy trucks to make a profit, your logical choice is an INTERNATIONAL, the heavy-duty favorite for the past 25 straight years because they are *built* to stay on the job longer.

They GO on the job! They *stay* on the job! V-8 powered INTERNATIONALS are available with 206, 226, 257 hp. engines—most powerful, most economical you can get. Models from 24,000 lbs. GVW to 76,800 lbs. GCW.

International Harvester Company, Chicago
Motor Trucks • Crawler Tractors
Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

International Trucks cost least to own!

"Robot"-control units can heat as well as cool.

• MORE RADIOACTIVE materials for preservation of foods are seen coming available. It's stated that some 200,000 curies of cesium-137 can now be produced annually at Oak Ridge National Lab.

• DAIRY MANAGEMENT and merchandising are getting new stress in graduate dairy programs at Michigan State U., Lansing. The option courses have been arranged through College of Business & Public Service.

• GIFTS ranging $100 to $2,000 have been given to 75 colleges by Corn Products Refining Co. Amounts were proportioned in recognition of number of CPRC personnel trained by respective institutions.

• BAKING-FIELD CAREERS are strikingly promoted in a new color booklet, *There's a Future for You in the Baking Industry*. Attractively illustrated, it describes various types of establishments, then outlines different positions that beckon. Both production and service phases are detailed, and finally there are tips on schooling. American Bakers Assn., Chicago, is distributing it.

Schedule of Events

December

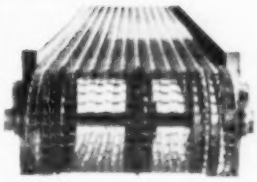
14-16—National Food Brokers Assn., annual meeting; Conrad Hilton Hotel and Palmer House, Chicago.

January '58

19-21—National Preservers Assn., annual convention; Ambassador Hotel, Atlantic City.
19-22—Canning Machinery & Supplies Assn., annual exhibition; Convention Hall, Atlantic City.
19-22—U. S. Brewers Foundation, annual meeting; American Hotel, Bal Harbour, Fla.
20-23—National Canners Assn., annual meeting; Traymore Hotel, Atlantic City.
22-26—National Potato Chip Institute, annual meeting; Hollywood Beach Hotel, Hollywood, Fla.
27-29—National Dairy Council, annual winter conference; Dayton-Biltmore Hotel, Dayton, Ohio.
27-30—United Fresh Fruit & Vegetable Assn., annual meeting; Mark Hopkins and Fairmont Hotels, San Francisco.
27-30—Plant Maintenance & Engineering Show; International Amphitheatre, Chicago.

February

13—Dairy Products Improvement Institute, annual meeting; Hotel Statler, New York City.
14-16—Institute of American Poultry Industries, fact-finding conference; Municipal Auditorium, Kansas City, Mo.
16-28—American Institute of Baking, production management seminar; 400 E. Ontario St., Chicago.



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You can handle every food-conveying operation from the loading hopper to shipping room with La Porte Belting.

Its rugged steel construction provides for long service. The open mesh feature assures a tight grip on the drive sprockets, eliminating creeping, weaving and jumping. It also permits quick cleaning with steam or scalding water without removing belt from friction drum, and allows for circulation of heat, cold, liquid or air around products in process.

This endless belt provides a perfectly flat surface for containers, empty or filled. Made of best galvanized material obtainable. It's the most dependable and economical belt for every process and handling operation.

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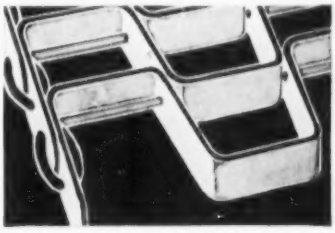

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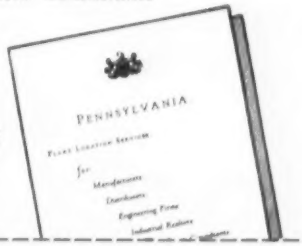
For Manufacturers, Distributors, Engineering Firms, Industrial Realtors, Management Consultants

This booklet tells you the tremendous scope of Pennsylvania's Plant Location Services, all at no obligation, of course.



Yes, you can have a complete, comprehensive A to Z plant plan, tailored to your specific requirements, by engineering and economics experts.

You'll be given the *how*, *why* and *where* on labor, markets, power, water, raw materials . . . financing, mortgage and building help. Thus *smaller* companies get a plant-planning service previously available only to a few industrial giants.

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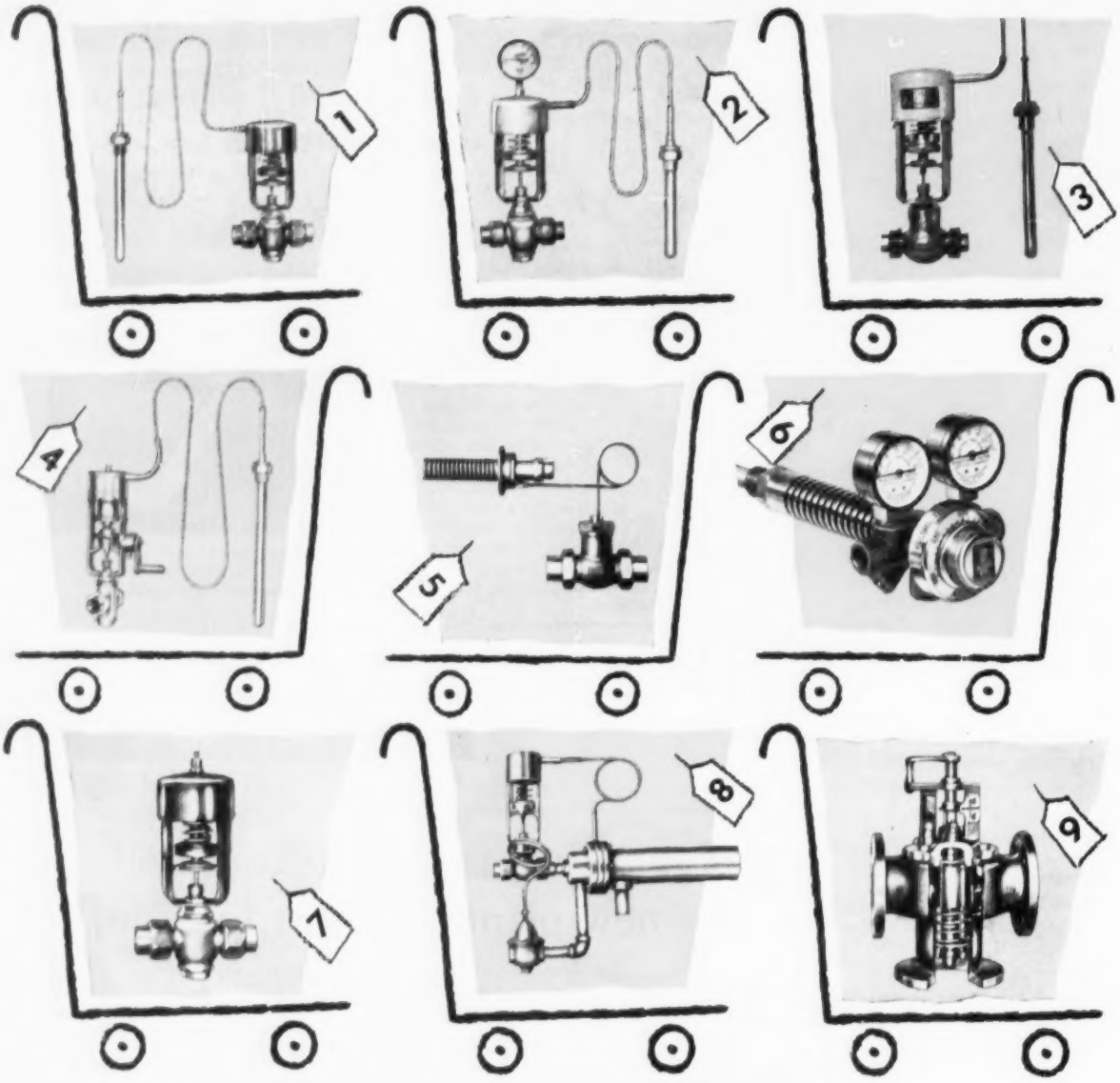

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(2) **Dozens of regulator types to choose from** . . . each designed to do a specific job well.

(3) **Over 50 years of specialized experience** in design, production and application of thermostatic devices.

(4) **Built-in dependable performance** and freedom from maintenance (up to 25 years in many instances).

(5) **One source responsibility**—all Sylphon Regulators are designed, manufactured, assembled and tested in the Fulton Sylphon plant.

(6) **Complete units**—every Sylphon Regulator is complete, self-reliant, self-operating and easily installed.

1. **No. 999** controls temperature of liquids, air or gases in industrial processes.
2. **No. 999-T** equipped with thermometer to indicate control temperatures.
3. **No. 997** safety type. Prevents over-heating.
4. **No. 923-Q** quick adjusting type for process control.
5. **No. 928** controls temperature in drying rooms, proof boxes, etc.
6. **No. 1100** for pneumatic or hydraulic control systems.
7. **No. 992** pressure regulator or pressure relief valve.
8. **No. 1350** mixes hot and cold water to produce water at desired temperature.
9. **No. 1280** for internal combustion engines, etc.

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Dr. George N. Cornell will direct new department—operations research—at A. E. Staley Mfg. Co., Decatur, Ill. His group will develop management data through techniques of scientific evaluation and mathematical analysis of existing company operations. He is succeeded in his former job of chief chemical engineer by **Nat Kessler.**

Personnel

Robert J. Abernethy has been elected v.-p. for engineering of Pepsi-Cola International.

Paul S. Armstrong, former general manager of Sunkist Growers, Inc., has been named special consultant to review USDA services to farmer co-ops.

W. Elliot Brownlee is now asst. v.-p. of manufacturing for Sunshine Biscuits, Inc.

Dr. William B. Esselen is now head of food technology at U. of Massachusetts. It was incorrectly stated in November FE (p. 138) that his new appointment was at M.I.T.

W. E. Dailey, Jr., president of Dailey Pickle Co., Saginaw, Mich., is new prexy for National Pickle Packers Assn.

Dan F. Gerber, president of Gerber Products Co., has been elected first v.-p. of Grocery Manufacturers of America, Inc. New second and third v.-p.'s respectively, are **H. E. Meinhold,** president of Duffy-Mott Co., and **R. Newton Laughlin,** president of Continental Baking Co.

Harold S. Gardner is now advertising manager of Florida Citrus Commission. He will have $4 million to spend for promotion. A veteran of 20 yr. in advertising, he is credited with originating "coffee break" and "one for the road" idea while with Pan American Coffee Bureau.

L. D. Griffiths, 46, has been moved up from executive v.-p. to president of Fanny Farmer. Former president **J. F. Burke** becomes board chairman, replacing retiring **John D. Hayes,** co-founder of company.

Robert C. Hibben has retired as executive secretary of International Assn. of Ice Cream Manufacturers and Ice Cream Merchandising Institute. That his 32 yr. career has been fulfilling is marked by following comparison: When he joined, IAICM membership totaled 380 members, and annual U.S. ice cream production was 240,018,000 gal. Today, there are 2,028 members and annual production is 848,484,000 gal. (including related products). "Bob" is succeeded by **Robert H. North,** asst. executive secretary since 1954.

William Howlett has been named v.-p. of operations for Consolidated Foods Corp., Chicago.

Dr. Ernest P. Imle has become research director of American Cocoa Research Institute. He has been a USDA project leader at Beltsville, Md.

Jack Kollman has been appointed executive v.-p. for Kitchens of Sara Lee, Inc., and elected a director.

James H. Marshall, v.-p. of California & Hawaiian Sugar Refining Corp., steps up to executive v.-p.

Jim Nash, head of Jim Nash Assoc., is new president of Package Designers Council. A founding member, he was also its first president in 1952.

Robert H. Perlitz is new president of Central Distributing Div., Consolidated Foods Corp., River Grove, Ill.

Harris Perlstein, 65, has resumed presidency at Pabst Brewing Co., succeeding the resigning Marshall S. Lachner, 43, who has filled post since April '56.

Karl E. Prindle, of The Dobeckmun Co., Cleveland, is recipient of Packaging Institute's first Professional Award. Honored is his "pioneer work in flexible films and outstanding contributions to packaging technology."

Edward A. Otocka moves up to operations v.-p. at National Biscuit Co.

Kenneth R. Rand has been selected as director of engineering by Quality Bakers of America Cooperative, Inc.

John A. Sargent has joined General Foods Corp. as v.-p. of finance.

Ray M. Schmitz, v.-p. and director of General Foods Corp., has been elected a director of Packaging Institute.

John C. Suerth has been appointed general manager of manufacturing of Gerber Products Co.

William M. Clemens, president of Trausch Baking Co., Dubuque, Ia., has been elected chairman of American Bakers Assn. New president is **E. E. Kelley, Jr.,** head of Butter Krust Bakeries, Inc., Lakeland, Fla. First and second v.-p.'s are, respectively, **Sanford V. Epps,** president, H. H. Claussen's Sons, Inc., Augusta, Ga., and **Russell E. Duvernoy,** secy.-treas., Duvernoy & Sons, Inc., New York City.

Dr. Conrad A. Elvehjem

—Finds New Frontiers in Nutrition

On the 20th anniversary of his isolation of niacin—an essential enrichment ingredient of bread—Dr. Conrad A. Elvehjem has received the Golden Loaf Award from the American Institute of Baking.

The years of the enrichment program have seen the virtual disappearance of deficiency diseases. And now, says this pioneering scientist who helped make it possible, the frontiers of nutrition have changed.

"We are passing to a study of the so-called degenerative diseases," he states.

His current research — in amino acids—deals with relationships among nutrients rather than with their identification.

Dr. Elvehjem holds a Ph.D. from the U. of Wisconsin, where today he is dean of the graduate school. He serves as chairman of the Food & Nutrition Board of the National Research Council. He has been a member of AIB's scientific advisory committee since its inception. And he has "enriched" scientific literature with many books and articles on nutrition.

Among his many honors are: The Mead Johnson and Osborne Mendel Awards (American Institute of Nutrition), the Lasker Award (American Public Health Assn.), and the Nicholas Appert Award (Chicago section, IFT).

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Dr. Everette M. Burdick has been chosen by Florida Citrus Mutual to head its newly created products division.

His goal, as defined by Association's General Manager Robert W. Rutledge, will be "to find research projects which offer most promise of further outlets for citrus crops, and to interest commercial companies in by-products to come or already developed."

Dr. Burdick is best known for developing a rapid method of determining the amount of peel oil in juices, use of "submerged combustion" in processing citrus wastes, methods of processing grapefruit juices, and for developing a method of isolating flavanone glucosides. He also has done considerable work on ammoniated citrus pulps.

His long experience in research includes 5 yr. with USDA's Northern Regional Research Laboratory and 7 yr. as research director for Texsun Citrus Exchange, Weslaco, Tex.

Industry

American Soybean Assn. has joined with USDA to send a team of growers, handlers, and exporters to Japan to observe problems of that country's manufacturers in using U.S. soybeans in their food products.

Buitoni Foods Corp. has established a new branch division in Chicago.

Campbell Soup Co. and American Assn. for the Advancement of Science jointly announce a new annual award ($1,500 and a bronze medal) in vegetable research. Aim is to stimulate major scientific contributions in production of vegetables for processing.

Crescent Mfg. Co., Seattle, has purchased coffee division (Gold Shield) of **Lang & Co.,** including the packaged nut division and 52,000 sq. ft. plant.

Dole Hawaiian Pineapple Co. has sold its corrugating and shipping container plant in Honolulu to Weyerhaeuser Hawaiian Co. for more than $2 million. Latter, a newly-organized subsidiary of Weyerhaeuser Timber Co., will supply Dole and other customers.

H. J. Heinz Co. has granted American Dietetic Assn. a $1,000 scholarship fund, also will finance an ADA vocational motion picture.

Kraft's Australian subsidiary plans to spend another $2 million on expansion soon—half of it on a new Cheddar and Swiss cheese plant at Allansford, Victoria.

Leslie Salt Co., San Francisco, and **Spice Islands Co.,** South San Francisco, have announced Leslie will acquire latter firm, with $1.5 million worth of stock, and operate it as a subsidiary.

Mars, Inc., is building a $1,800,000 one-story addition to its Chicago home plant.

Minute Maid International has signed royalty agreement to furnish technical and production assistance to Murray Groves, Robinvale, Australia, citrus processor.

Pet Dairy Products Co., subsidiary of Pet Milk, has purchased White Way Pure Milk Co., Decatur, Ala., reportedly at price of over $1 million.

Safeway Stores is building a $3 million distribution center at Clackamas, Ore.

Stokely-Van Camp, Inc., is moving its frozen-food headquarters from Mount Vernon, Wash., to Oakland, Calif. Change led to resignation of E. J. Watson, v.-p. and general manager. V.-P. William H. Foster will direct division, while continuing in charge of Western canned goods.

United Biscuit Co.'s Bowman division is planning an $8 million factory in Denver.

United Fresh Fruit & Vegetable Assn. will join U. of Minnesota in a research project on "possible interrelationship between eating of fats and such carbohydrates as are found in fresh fruits and vegetables," says Executive V.-P. Alan T. Rains. Study will be directed by Dr. Ancel Keys, head of U.'s Lab. of Physiol-

ogical Hygiene, and will be based only on natural-food intake, excluding any "scientifically-compounded" mixtures.

Hazleton Laboratories, Inc., Falls Church, Va., has set up a western division in Palo Alto, Calif. New lab will specialize in determining amount of pesticide residues left on foods after dusting and spraying. It also will do research on additives.

United Vintners, Inc., San Francisco, now controls S&W Fine Foods, Inc. It presently owns about 48% of latter's outstanding common stock, and S&W's nine-man board of directors includes five suggested by UV President Louis A. Petri.

Associated Industries

American Can Co. and **Marathon Corp.** stockholders have approved merger agreement.

Anaconda Co. will acquire **Cochran Foil Co.** in exchange for capital stock, if authorized by shareholders.

Celanese Corp. of America is building a new unit at Belvidere, N. J., to step up production of polyvinyl acetate emulsions.

Fr. Hesser Maschinenfabrik, Stuttgart, Germany, marks 50-yr. "jubilee" of its chief designer, Heinrich Schwinger, citing his many contributions to advancement in packaging machinery.

Kaiser Aluminum & Chemical Corp. says that company expansion has entailed costs that have recently held down earnings, but program to up production capacity is now nearly completed.

Deaths

Charles W. Crawford, 69, retired commissioner of FDA. A crusader for pure foods, he advised drafters of 1938 Food Drug & Cosmetic Act.

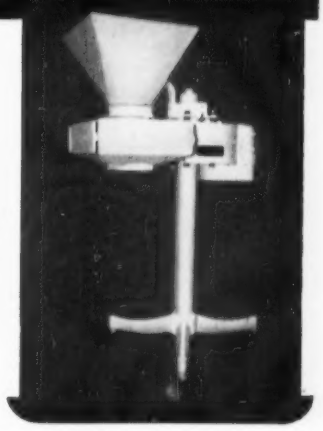
J. Henry Lienau, 86, retired v.-p. and managing director of National Sugar Refining Co.

George W. Merck, 63, board chairman of Merck & Co., Inc.

Mervyn C. Phillips, 59, v.-p. of The Griffith Laboratories of Chicago.

RICHMOND / SPROUT-WALDRON

Gyro-Pedestal Sifters



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Write For Bulletin 139

These high-speed sifters are designed for handling either batches or streams of free-flowing materials containing small percentages of oversizes. They can be equipped with casters for portability, attached to floor or ceiling, mounted on bench or cabinet, or installed directly into spout or chute. All material – contact points can be made of stainless steel. Capacity – 60 lbs. per minute through 14 mesh. Get details now.

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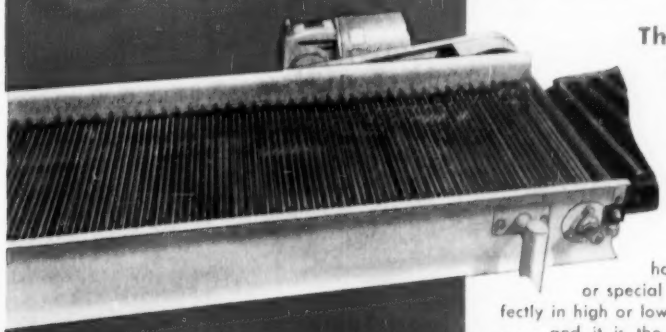

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DUR-A-GRID is Petersen's newest concept in conveying systems. It is made of link chains, sprocket driven, with products riding on the grids. One drive handles up to 150 running feet . . . available in standard or special widths . . . will not shrink or stretch . . . will operate perfectly in high or low temperatures . . . it will outlast ordinary belting by years . . . and it is the simplest conveying system to maintain. Where products must be in line, power disc turns or side bow link turns complete the system for the conveying of your products in the most efficient and economical way . . . the Petersen way. DUR-A-GRID Conveyors can be easily and inexpensively installed by either our engineers or your maintenance crew.

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Don't give normal seasonal or regional variations in flavor a second thought when you use MSG (pure mono sodium glutamate) in food processing and preparation.

MSG controls the over-all flavor features of quality protein foods. By blending and strengthening their naturally fresh taste MSG can create a uniform flavor identity the consumer recognizes. It is economical and easy to use.

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Denver, Colorado

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QUESTIONS AND ANSWERS

NOVEMBER PROBLEM

Non-Uniform Quality

Question — In examining our canned goods, we have observed occasional samples that are decidedly light in color compared to our regular production.

We can't trace these light-colored products to any one retort or account for them in any other way. Can you throw some light on this mystery?

Answer—There are at least two possible explanations for your product's sub-standard color. We assume that raw materials, formula, and processing generally are well supervised, so that the difficulty stems from a temporary lapse of control. We further assume that light color indicates less than normal heat-treatment.

One possibility is that retort venting is not always complete and air pockets can cause inadequate product heating. Proper procedures for manual venting of various retorts are detailed in National Canners Assn. Bulletin 26 L. The important thing is to allow sufficient time for complete air removal.

A second factor might be occasional delays in closing filled cans and loading them into the retort. This could happen at lunch time or when shifts are changed. If a retort crate were only partially filled, and some of the load cooled before the balance was added, the partially-cooled portion probably would come out of the process slightly undercooked. That's because canning processes are based on a fixed "initial temperature."

In the first instance, correction would require automatic venting controls or stricter supervision of retort personnel. In the second case, filling of crates would have to be rigorously supervised.

OCTOBER PROBLEM

Corroding Tank

Question—We have a serious corrosion problem with a simple stainless-steel sauce tank made for us by a local boiler shop. It is fitted with a portable electric agitator.

Though our sauce is not very corrosive (as evidenced by condition of the pipelines handling the product), the tank develops pits, then it leaks and must be replaced every two years. How can we increase its service life?

Answer—Stainless steel requires a thin surface film to protect it from corrosion. Pitting can occur when this film is broken.

Localized disruption of the protective film, and pitting, could be caused by food residues if cleaning is inadequate. The smoother the tank interior, the less chance for food particles to adhere, so inspect the tank carefully to see if polishing is required. A conventional food-industry finish is No. 4, sometimes called "120 grit."

Corrosion can also be accelerated by contact of dissimilar metals and by stray electric currents. Be sure that electrical equipment—especially agitators—are properly grounded. If the agitator clamp is not of stainless, insulate it from the tank.

And another frequently unrecognized cause of corrosion is improper use of sanitizing agents. Unfortunately, hypochlorites (effective bactericides) attack the protective film on stainless steel. To prevent this, many suppliers recommend keeping hypochlorite solution highly alkaline. Others suggest use of inhibiting agents, such as alkaline phosphates.

Another Answer

Although the manufacture of stainless steel has been vastly improved during the past 10 years, there are still certain techniques vital to proper welding. Your corrosion problem is not unusual and may be caused by: (1) Incorrect welding, (2) use of wrong type of stainless steel, or (3) excessive vibration due to portable agitator.

Let's deal with each factor:

If your stainless is one of the austenitic types with an ASI number in the 300's, it is important that it be quickly cooled, when welded, to prevent carbide migration to grain boundaries. Otherwise, equipment may fail at points adjacent to welds. To prevent this, quench the weld with cold water after each rod is applied. And use a rod with composition similar to the parent material.

Furthermore, severe service conditions may justify the extra cost of fabricating a tank of low-carbon stainless (ELC 316, 0.03% maximum).

Although your sauce "is not very corrosive," this depends on materials employed. Stainless steels do vary in corrosive resistance and Type 316 generally is most satisfactory for severe service. There may be some component in the sauce—chloride, acid, etc.—causing the trouble.

International Nickel Co. has data covering all types of materials and services. It would probably pay to consult them.

If you are convinced that tank fabrication is not the problem, try testing samples of various stainless steels or other suitable corrosion-resistant materials in your sauce. Relative corrosion rates, while not an absolute measurement, often indicate the material to use.

Finally, there is the possibility that your agitator may cause excessive vibration. Over a period of time, this weakens seams and promotes corrosion.—*S. S. Prince, Chief Engineer, U. S. Vitamin Corp., New York City.*

Cuts Cartoning Losses

In reply to your September problem on erratic cartoning, here are three requirements for high-speed automatic packaging: (1) Precision machinery, (2) proper equipment maintenance, and (3) rigid quality control.

Maintenance departments must not only repair breakdowns, they must prevent them. Moving machine parts are subject to wear, which so broadens machine tolerances that consistent production cannot be maintained unless equipment is completely overhauled.

Troubles caused by gradual wear can be much more elusive than the sudden and complete malfunction due to misalignment or failure of some machine member. Such a breakdown usually is identified by a consistent pattern of carton losses. When the trouble cannot be easily located, you have to check all adjustments systematically for conformance to the manufacturer's specifications.

If after thorough realignment of

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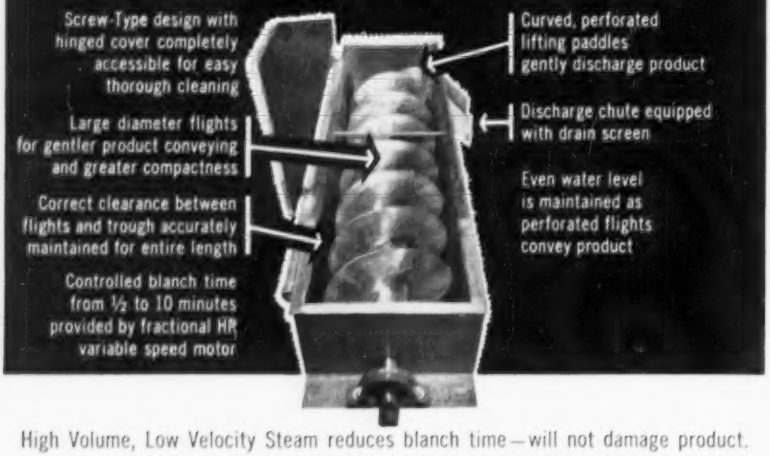
THERMASCREW WATER BLANCHER
designed specifically for medium and small processors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Write for complete information

CONSOLIDATED
PACKAGING MACHINERY CORP.
BUFFALO 13, NEW YORK

Questions & Answers

the machine, malfunction still continues, possible variations in the carton must be considered.

They may stem from many sources: (1) Carton may not be cut to proper dimensions; (2) creases, cuts, and scores may not be of required type; (3) Coatings (inks, waxes, varnishes, etc.) may vary from one shipment to the next; and (4) cartons can be severely distorted by improper handling or storage.

On sealed cartons, adhesive may be a source of trouble. Age and condition of glue, improper application, poor penetration, and the wrong range of "setting" properties can all contribute to poor closure.

When greater than normal carton losses occur, your supplier can often be of great assistance.—*A. L. Roth, Packaging Equipment Engineer, Fiberboard Paper Products Corp., San Francisco.*

Antioxidant for Chocolate?

Question—Is it necessary to use antioxidants in chocolate-type coatings?

Answer—It wouldn't do any harm, but we doubt that it is necessary. Actually, antioxidants are of no value with this type coating which contains saturated fats.

But it might be a good idea to use antioxidant-treated chocolate paper boards, especially in packaging of coated bars with centers containing unsaturated fats. Such fats, particularly from nuts, seep through the coating and onto the board, thereby producing rancidity.

Selecting a Package Liner

Question—Our company is developing a pie-crust mix. To package this product, we would like, if possible, to use an existing machine which automatically sets up and lines a carton. Can you recommend a suitable, and not too expensive, material to use for the carton liner?

Answer—You will need a packaging film with good grease- and oil-resistance, because of the relatively high fat content of pie-crust mix. It must also have sufficient tensile strength, tear strength, pliability, and adhesive receptivity to operate on your packaging machine. Water-vapor resistances should be sufficient to prevent undesirable changes in the product during its shelf life.

We suggest something like a wax-laminated glassine paper of 45/52

or 47/56-lb. weight. Such a material has the required properties for packaging a pie-crust type of product.

You mention an existing machine. It is not clear whether this equipment includes a filler as well as packager. If so, it would be well to carefully check on the suitability of the filler for a high-fat product like pie-crust mix. Such a product is not the easiest thing to fill successfully. You will probably need an auger-type filler.

Polymerized Shortening

Question—Do you know why the shortening we use in deep-fat frying becomes gummy? And what can we do to overcome this condition?

Answer—What you're running into is polymerization—essentially an inter-reaction of fat molecules with one another. Such shortening is more viscous than new fat and, in extreme cases, will appear gummy.

Extent of polymerization can be measured by its decrease in iodine value (unsaturation of fat). Fats with high iodine values tend to polymerize more readily. And, for this reason, a heavy-duty fat for frying should be hardened as much as possible. But, we understand, need of maintaining reasonable plasticity and desirable shortening limits the degree of hardening.

To the best of our knowledge, there are no acceptable additives that can be employed to check polymerization. Air, heat, and metals promote polymerization.

So we suggest you take steps to eliminate contamination of fat by metals. Best way, of course, is to use inactive metals on your frying equipment. Most desirable is use of No. 304 or 316 stainless steel.

If you still find you can't control polymerization, then frequently change the shortening in your frying system.

Packaged Frozen Meats

Question—We are blast-freezing a portion-control-style beef, veal, and pork cube steak on pans in a −30F. tunnel. Frozen steaks are then packed into 8-10 lb. cartons in a 45-50F. room and held in a −15F. storage freezer.

Pack consists of layers of frozen steaks between waxed paper, with the top layer covered with aluminum foil. Entire pack is put up in a polyethylene bag, tied on top, and packed into

to bring these low costs

Equipment	Soil	Oakite Material	Cost per Unit
1200 gal. cooking mixers	cooked on meat, cereal fats	*Oakite General Cleaner	$1.09
300 gal. juice kettles	burned on deposits, stains	Oakite General Cleaner Oakite Comp. #84M	.78 .52
sausage stuffers	grease and meat	Oakite General Cleaner	.27
steak lines & tanks	burned on meat	Oakite Comp. #62	1.38
stainless smoke houses	carbonized grease	Oakite Comp. #62 Oakite General Cleaner	4.92
2900 sq. ft. floor	fats, dirt, spillage tire marks	Oakite Comp. #24	2.49

*Drained on to floor to clean area around equipment, too

These figures from the actual work-sheet in a midwest food plant tell only part of the story. Here's what happened.

First, the local Oakite man reviewed all the plant operations . . . then he sat down with pencil and paper. He selected cleaning compounds that could do double and triple duty, thereby minimizing storage and handling. He recommended, for each job, the most effective concentration and temperature of cleaning solution. By shortcuts and improved methods, he sought to reduce time and cost on every operation. Finally, he went through a full night shift with the cleaning crew—checking, observing, looking for more possible shortcuts.

It's how a typical Oakite Coordinated Sanitation program works. If you'd like it to work for you, call your local Oakite man. Meanwhile, write for free booklet on food plant sanitation to Oakite Products Inc., 26G Rector Street, New York 6, N. Y.

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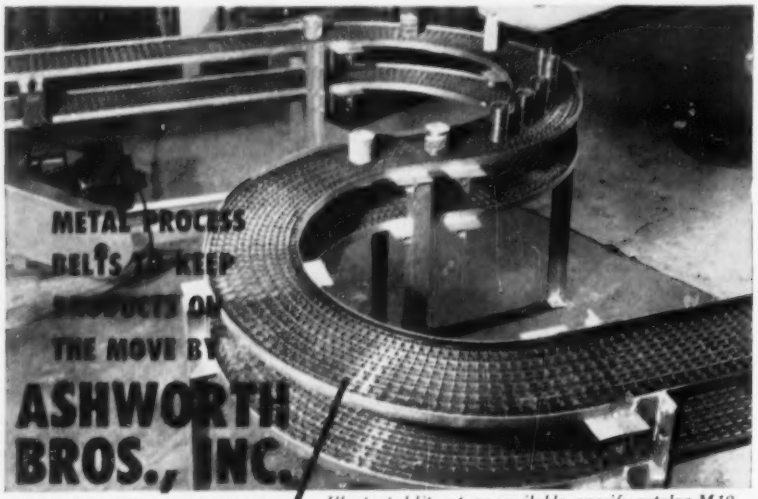

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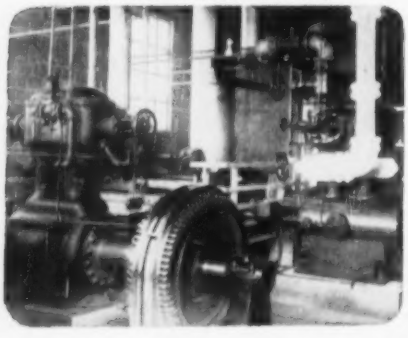
The golden apple of mythology is the symbol of this firm's celebration.

Says J. A. Hauser, president of the C. H. Musselman Co., Biglerville, Penna. Now celebrating its Golden Anniversary, the firm is one of the world's largest processors of apples, cherries, peaches, berries and tomatoes.

Beginning in 1934, the Musselman Co. has installed Frick refrigerating systems in each of its four big plants. The original Frick compressors are still running efficiently. A total of ten Frick machines are used today for process work, quick freezing and cold storage.

Two of the ten Frick refrigerating machines serving the C. H. Musselman Company.



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Questions & Answers

a cardboard box. Entire top layer and edges of steaks nearest the box display freezer burn after 24-hr. storage.

How can we check this freezer burn?

Answer—Evidence of freezer burn inside of 24 hours seems like an awfully short time. Anyway, there's one suggestion we might make. It's to substitute the moisture-evapor-pervious polythylene bag with an impervious one, like Saran or Cryovac.

It's Good to Freeze Foods

Question—Just what are the relative merits of freezing foods?

Answer—Most significant is that they're *almost* comparable to the quality of fresh foods. Generally, color, appearance, and flavor of frozen fruits and vegetables are very good.

But pre-cooked, ready-to-heat-and-eat frozen foods do not rank as high as fruits and vegetables from stand-points of color, flavor, and appearance. Yet, they are convenient for the consumer.

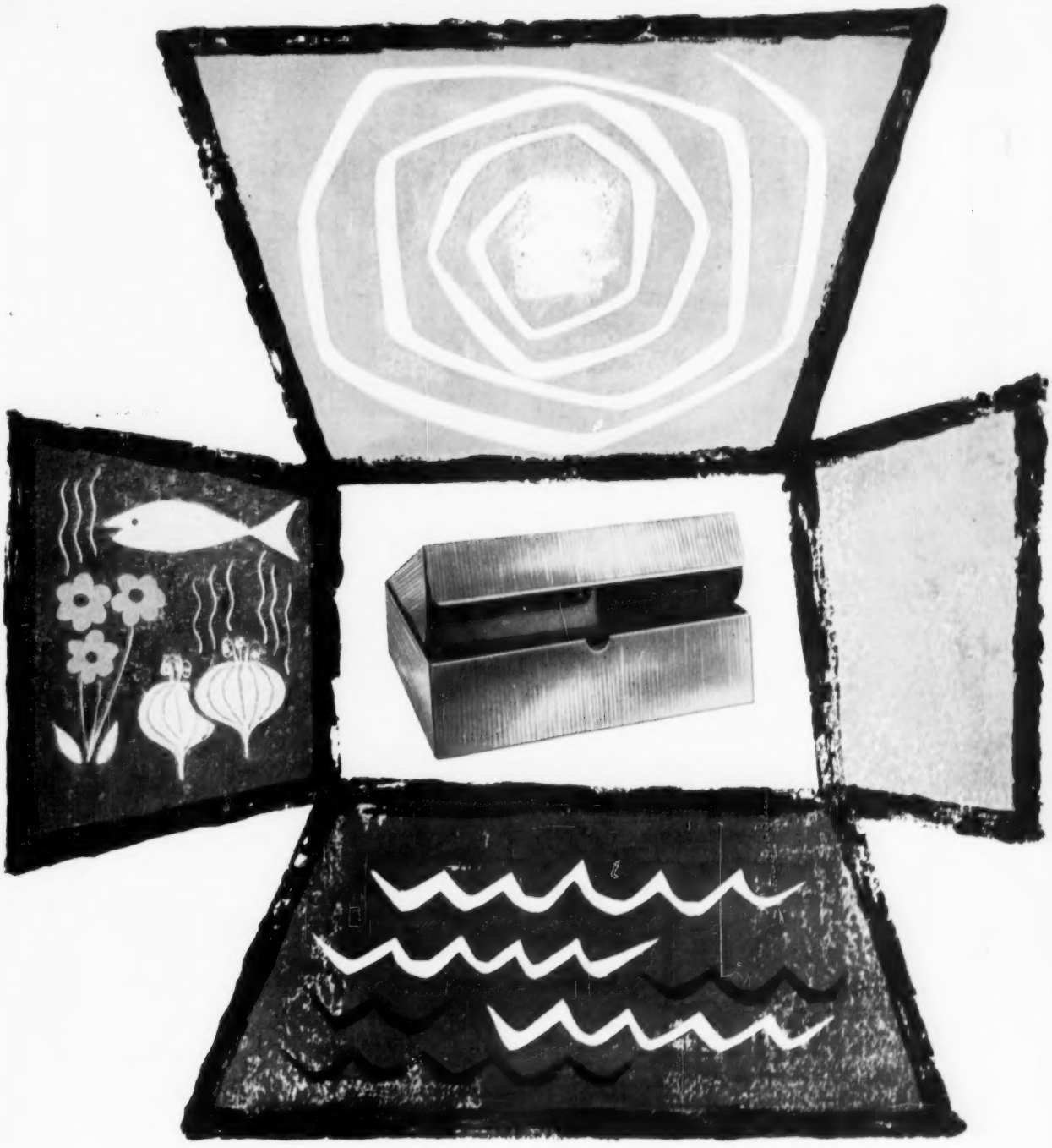
Also, certain pre-cooked frozen foods are superior quality-wise to comparable canned products. This is particularly true with delicately flavored foods.

However, freezing, low-temperature storing and transporting of frozen foods make them costlier than canned foods. Higher cost of retail-store handling must also be considered.

Adverse quality changes during freezing and storing is another factor. Such changes involve loss of moisture, toughening of product, denaturation of starch and protein, and irreversible changes in fats or emulsions. And they may be brought about by oxidative or enzymatic reactions.

Q.—Have you any suggestion for preparing garlic for dehydration?

A.—Standard procedure is to remove the skin, either by hand or by abrasive machine, and then slice. Sliced garlic is then loaded into trays at the rate of 1 to 1¼ lb. per sq. ft. of drying area, and dried at a temperature not exceeding 140 F. Quite often it is taken out of the dryer before reaching the desired 4% moisture content, and drying is finished in a bin. Finally, the dried slices are ground in a hammer-mill, and sifted.



Alcoa Foil in new corrugated boxes solves temperature and moisture control problems

These new boxes give up to 100% better refrigeration efficiency for shipping and storing all kinds of perishable foods and food products . . . reduce shipping weight, provide more shipping space by eliminating need for packing with ice.

With Alcoa Foil laminated on the outside, **no** moisture can get in. If your product must **retain** its moisture, foil lamination on the inside prevents seepage that would soak or weaken corrugated containers.

Contact Your Nearest Box Manufacturer—Alcoa doesn't make foil-laminated corrugated boxes, but will supply your present manufacturer, as well as work directly with him. To get further information, write for our booklet, "New Alcoa Foil in Corrugated Boxes." Simply fill in and mail the attached coupon.

ALCOA ALUMINUM

NEW! "ALCOA THEATRE" Exciting Adventure Alternate Monday Evenings

Aluminum Company of America
1653M Alcoa Building, Pittsburgh 19, Pa.

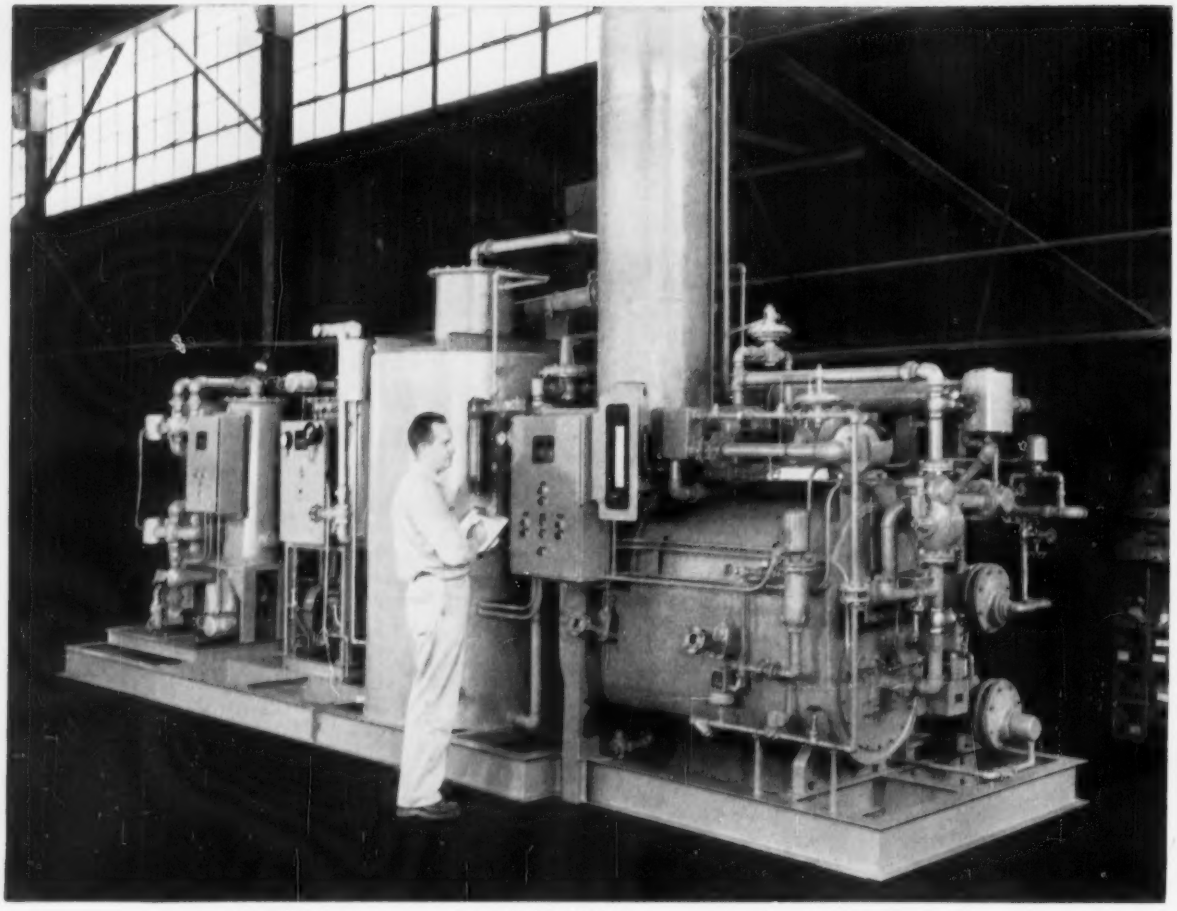
Please send me the name and address of the manufacturer of Alcoa Foil corrugated boxes who is located nearest to me, and also your booklet, "New Alcoa Foil in Corrugated Boxes."

Name _____

Street _____

City _____

State _____



Complete nitrogen system includes LN300 generator and drying equipment on a common base, factory tested, ready for fast, simplified installation.

Here It Is...The Finest Nitrogen Generator Ever Built

No other nitrogen generator brings you all the advantages of Gas Atmospheres' advanced unitized design. Here's more generator in less space . . . actually 20% less floor space required, yet all operating and maintenance points are easily accessible.

It's factory built on a common base . . . just set it in, connect utilities and process gas piping and it's ready to go. All controls and measuring devices are centrally located. Simplified combustion control assures ultimate safety and high purity analysis. Exclusive air-fuel control guarantees precise ratio adjustment . . . eliminates complicated, troublesome carburation system.

Fuel-air mixing is accomplished at the burner for highest safety. This also permits the use of a wide range of fuels including natural gas, LPG, hydrogen and light fuel oils.

Complete purification at any flow rate is assured by Gas Atmospheres' exclusive absorbing system.

These are a few of the many reasons why you'll want to talk with a Gas Atmospheres' engineer when next you're considering nitrogen generator equipment. Write for your copy of new Nitrogen Generator booklet today.

gas Atmospheres, inc

equipment for producing industrial gases

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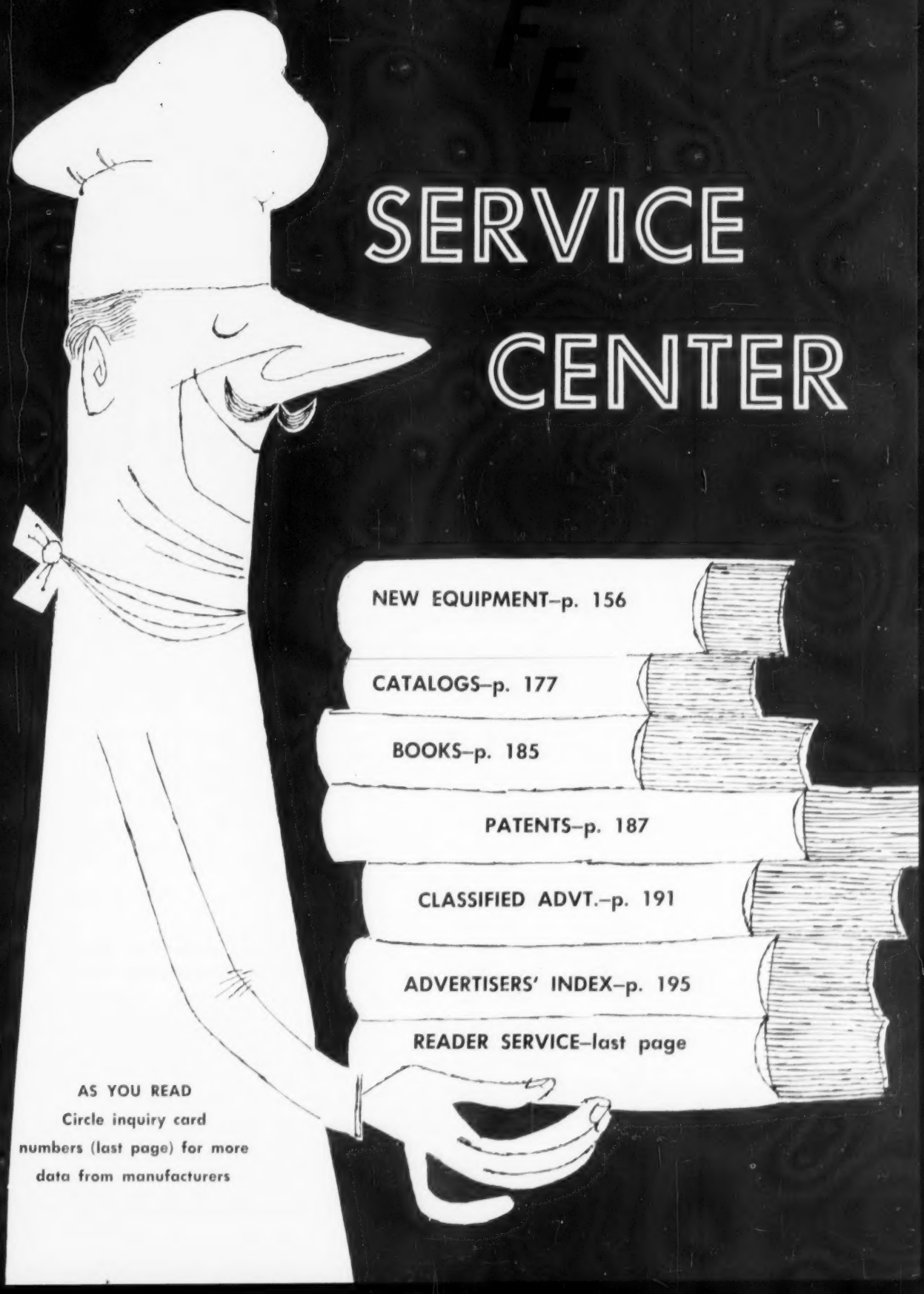
SERVICE CENTER



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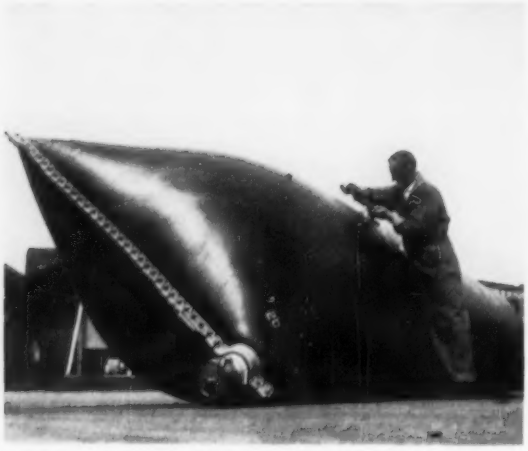
AS YOU READ

Circle inquiry card numbers (last page) for more data from manufacturers



COST-CUTTING 3,800-gal. liquid tank converts a trailer for 2-way haul—dry cargo in one direction, liquids on return trip. Rubber-fabric unit is filled through fitting in lower right corner or at top.

THREE STEPS in changeover: After dry cargo is removed (left), tank is simply unrolled (center) and filled with liquid for return trip. Unit also serves as a portable indoor-outdoor storage vessel.

Roll-Up Tank For 2-Way Dry-Liquid Hauls

Resembling a giant toothpaste tube when filled, this rubber-fabric container is seen revolutionizing delivery of liquids by truck, rail, and barge.

Known as Scaldtank, unit widens the economical truck-operating radius by enabling two-way haul of solids and liquids in the same trailer—carrying dry cargo in one direction and liquids on the return trip.

In addition, it converts every rail car and barge to a potential liquid carrier. And the new tank provides an economical, efficient way to store large volumes of liquids.

Handling of animal and vegetable oils, and chocolate, are expected to be initial food applications for the unit, which is 56 in. dia., 35 ft. long, and holds 3,800 gal. When empty, it weighs 1,040 lb., lies flat, and can be rolled into a compact cylindrical package 25 in. dia. and 7½ ft. long.

Rolled out on a trailer, unit is filled through a fitting at one end, or from the top. Atmospheric pressure collapses the tank as it is emptied at journey's end. The flat tube is then rolled up and stored in trailer's forward section to permit loading of dry cargo for the return trip.

Unit is made of four plies of rubber-coated rayon tire fabric, which is molded like a tire. Ends are sealed by metal closures, and the outer surface is of Neoprene for oil and weather resistance. Inner surface can be made of a variety of special rubber compounds, which enables handling of almost all liquids. For edible materials, a polyethylene liner is used.

Containers can be made in any size to fit any truck, rail car, or ship. The 3,800-gal. unit is considered most practical for trucks, since it permits maximum payloads in most cases. A 6,500-gal. size is planned for rail cars, and 10,000-20,000 gal. tanks will be available for barges and plant storage. The latter application offers maximum flexibility because the storage tank are easily portable.

Use of the new container enables Industrial Molasses Corp., Leonia, N. J. to double its distribution radius in animal-feed operations. The company trucks molasses to feed mills, then loads either grain or cattle for the return trip.—*United States Rubber Co., 1230 6th Ave., New York City.*

Circle 156A on Reader Service Card

Want More Information?

It's free — and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard — back of book. Then sign at the bottom and mail. For your convenience, too, these items are listed and keyed in the Reader Service Section.

New Pour-In-Place Flooring Cuts Maintenance Costs

High strength, impact-and-chemical resistance, and rapid curing are advantages cited for a new poured-in-place monolithic floor surfacing.

Known as Monile, product is a combination of chemicals, copolymers, and aggregates that can be mixed in an ordinary cement or plaster mixer. Half-inch applications on concrete or wood are recommended,

so there's no need to cut out old floors. Work may be done by flooring contractors or a plant's own maintenance crew.—*Master Mechanics Co., 2097 Columbus Rd. Cleveland.*

Circle 156B on Reader Service Card

Adjustable Ball-Table Stand Eases Materials Handling

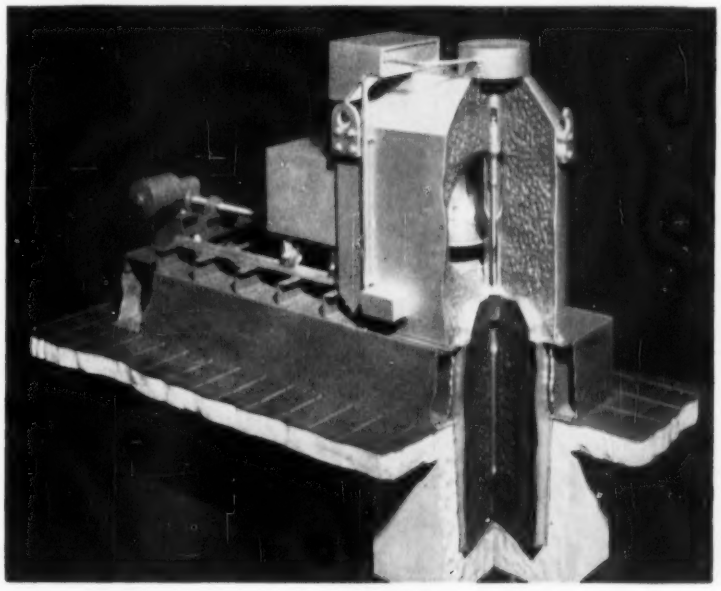
Case routing may be sped and simplified with use of this ball-table transfer stand, which accommodates conveyors up to 18 in. wide.

Known as Traffic Circle, it is used as a junction for 2, 3, or 4 gravity conveyors, also as a variable-angle gravity curve when a broad area is to be covered by shifting a line.

Unit consists of a circular ball-caster table on three adjustable legs. Four conveyor-support brackets at the outer rim slide around the table to provide any pattern of conveyor junction, but are firmly retained and cannot be removed without tools. Legs may be rapidly height-adjusted up to 6 in. by hand knobs having safety grip locks. Large foot pads provide stability for the tripod.

Two models are available—a standard unit for indoor service and a special design (Nylo Ball) for outdoor use, or where equipment must be washed or steam-cleaned regularly. Standard model has ball-bearing-type casters and a table painted aluminum enamel. The special one has nylon-seated ball casters, and all metal parts are zinc coated.—*M-H Standard Corp., 513 Communipaw Ave., Jersey City, N. J.*

Circle 157A on Reader Service Card



Self-Contained Cobalt-60 Unit Spurs Radiation Study

Here's a new laboratory tool for radiation research—a self-contained, safe irradiator using Cobalt 60 as source material.

Unit (Hotrodder) requires no special shielding room, no auxiliary radiation monitoring, and no remote handling. Made of heavy stainless-steel plate filled with void-free lead, it safely accommodates up to 25,000 curies of source, and takes a sample up to 10 in. dia. by 10 in. long.

In operation, sample is placed on a tray in front of a large electrically driven lead-filled block. By merely pushing a button on control console, operator moves sample into irradiation chamber, which automatically locks itself to assure safe operating conditions.

The source is then moved into position automatically and sample is exposed. After a pre-set time cycle (1 min. to 120 hr.), sample is removed and source is safely stowed. Several samples may be treated simultaneously.

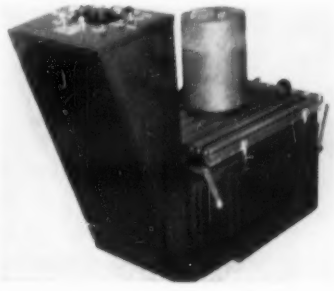
Electrical and mechanical interlocks prevent exposing the source before sample is inside chamber. And tubular access permits connecting the sample to outside water, gas, or electric lines during radiation.—*Budd Co., Nuclear Systems Div., 2450 Hunting Park Ave., Philadelphia.*

Circle 157B on Reader Service Card

Automatic Checkweigher Is Highly Accurate

This new scale offers production weighing with laboratory accuracy, reportedly 1 part in 10,000.

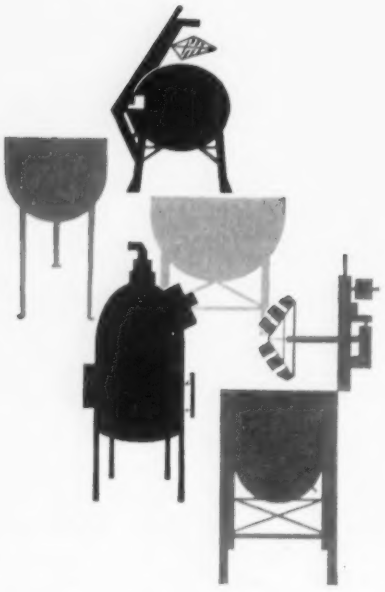
Known as Automatic Checkweight Scale, it employs a precision leveling system which functions without knife-edge pivots. Exact weight is indicated by a direct-reading decimal register in pounds or grams. Unit



CUT OUT AND FILE

when you consider
what product contamination
costs you

KETTLES OF CRUCIBLE STAINLESS COST LESS



Install a kettle made of Crucible Stainless Steel and you're certain of this: it can't alter the flavor or change the appearance of food. It never takes flavor *away* either. It effectively resists the really harsh processing liquors and never chips, peels, or cracks. And no foods, no matter what corrosive acids they contain, can break down its smooth, shiny surface. That's why Stainless Steel kettles cut product contamination that wastes money.

It's this ability to save money that accounts for the growing impact of Crucible Stainless on the food industry. Cleaning is another good example: Stainless cleans 5 times faster than any other metal. And it comes clean so thoroughly that Stainless equipment can be used on many jobs — flavor never carries over from one product to another.

In the long run, the more equipment you have made of Crucible Stainless, the less you'll pay to process food.

To get more facts about Crucible Stainless, take either of these simple steps: (1) write for free 40-page booklet discussing the use of Stainless Steels in the Food Processing Industry, or (2) contact Crucible Steel Company of America, The Oliver Building, Mellon Sq., Pittsburgh 22, Pa.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor — Railway & Power Engineering Corp., Ltd.

may also be used for classifying and segregating weight groups.

Scale is available in various capacities and platform sizes. It can be furnished with ticket printer, chart recorder, remote weight indicator, and automatic conveyor.—*Thayer Scale Corp., Thayer Park, Pembroke, Mass.*

Circle 157C on Reader Service Card

Batching-Control Console Logs Remote Weighings

Compact and versatile, this new console houses control elements for various weighing operations, plus a listing and adding unit that records weight data originating at remote scales.

Used in conjunction with maker's weighing system, unit can be located up to 1,000 ft. from the weighing point. Its pilot lights permit an operator in an office, for example, to "observe" an entire batching or weighing operation. A lock on the cabinet door prevents unauthorized persons from tampering with equipment.

Plate-circuit relays are enclosed in polystyrene cases, each with a standard plug. All contacts are silver. They plug into standard sockets inside the console, an arrangement that permits easy replacement.

Recording unit is located on the console shelf so that weight figures are readily available. Operator merely presses a button for a total or subtotal of weights.

Number of weighing cycles can be pre-set so that system operates through this number automatically. As cycle is completed, the figure is recorded on a digital indicator.—*Toledo Scale Co., Toledo, Ohio.*

Circle 159A on Reader Service Card

Truck's Cantilever Lift Arms Speed Waste Disposal

Cantilever arms on this truck-mounted top-bay compactor body are the key to a new, highly efficient waste-collection system. Arms bridge the cab area to eliminate all operational hazards.

Designated Dumpmaster CA, unit operates in conjunction with waste-storage containers located at refuse-accumulation points throughout a plant. This system is available on an outright purchase basis or through maker's contract haulers, who supply the containers and service them.

In operation, containers are dumped as driver engages their pick-up channels with the arms. Waste drops through the body's top bay, where it is hydraulically compressed to one-third the original volume. This compaction permits loading of some 60 cu. yd. of material.

Pickup, dumping, and returning the container require less than 60 sec., an operation performed without driver leaving the cab. A 6-cu.-yd. container holds the equivalent of 40, 30-gal. trash cans, whose emptying would require 1.3 man-hr. under ideal conditions.

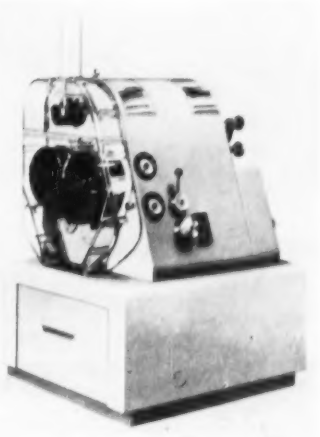
Containers are available in capacities of 1-6 cu. yd., with casters on all models for in-plant accumulation points.—*Dempster Brothers, Inc., 7125 Shea Bldg., Knoxville, Tenn.* Circle 159B on Reader Service Card

Grinding Rolls Are Visible In Experimental Mill

Grinding characteristics of granular products may be closely observed in this versatile experimental roller mill.

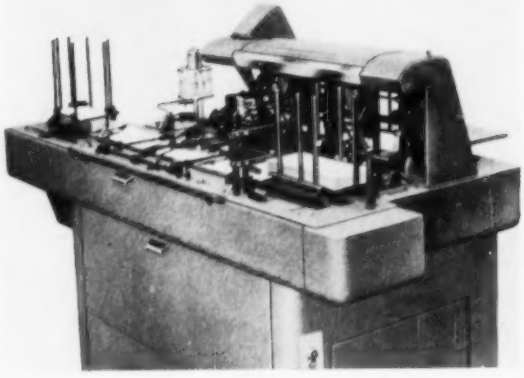
Unit (Vario-Rollstand) employs open-end rolls (9 or 10 in. dia., 4 in. long) in a clear-plastic enclosure. They may be quickly and easily changed for runs with various roll materials, surfaces, and/or corrugations. Roll speed is variable from 200-1,400 rpm., and differential speeds range 1:1 to 35:1.—*Miag North America, Inc., 1616 S. 8th St., Minneapolis.*

Circle 159C on Reader Service Card



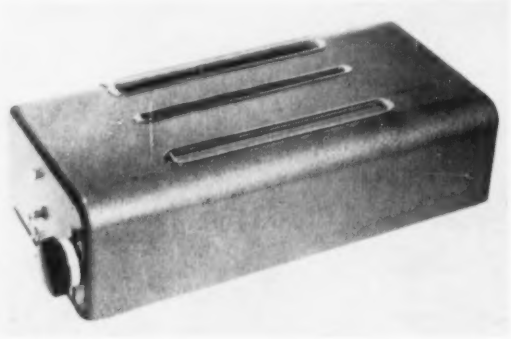
High-Speed Units Automate Data Processing, Mailings, Photocopying

DATA-PROCESSING UNIT combines printing and calculating to automate billing, order writing, and statistical control. Employing punched tape, machine (Model C Computyper) operates from data produced in other units and/or creates data for other equipment. Documents are typed at 100 words per min. Extensions, discounts, etc. are printed automatically.—*Friden Calculating Machine Co., San Leandro, Calif.* (160A)

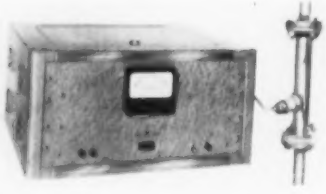


INSERTER-MAILER, a high-speed 2-station unit, automatically gathers enclosures, opens flaps, fills envelopes, seals, prints postal indicia, counts and stacks finished pieces. Machine (2-Station Inserter) handles all mailings containing up to two enclosures—bills, statements, checks, and punched cards. V-block detectors prevent double feeds or misses.—*Inserting & Mailing Machine Co., Phillipsburg, N. J.* (160C)

PHOTOCOPY MACHINE automatically produces sharp, ready-to-use black and white copies of any printed, typed, or written matter—regardless of color or ink. Operated under normal office-lighting conditions, unit (Copycat "99") returns the original and takes the copy through all development phases within seconds. Machine is 20 in. wide, weighs 18 lb. *Copycat Corp., 41 Union Sq. West, New York City.* (160B)



Circle key numbers on Reader Service Card



Sanitary Caloric Flowmeter Gages Viscous Materials

Mass rates of liquid in laminar flow may be accurately measured with this sanitary caloric flow-meter Applications include gaging highly viscous materials and extremely low flow rates of other fluids.

In operation, unit (FM 100) measures rate of heat transfer through the boundary layer of a material flowing through a smooth-bore cell. Measuring elements do not contact the fluid, thus are protected against chemical and mechanical attack.

Instrument employs a small constant-wattage input to a heater in the cell. Output, representing temperature differential between upstream and downstream sensing elements, is a millivolt signal which can be used directly for recording, controlling, or data processing.

Flow cell is available in a variety of metals, including stainless steel, and in diameters of ¼ in. and up.—*Industrial Development Laboratories, Inc., 17 Pollock Ave., Jersey City, N. J.*

Circle 160D on Reader Service Card

New 300-Gal. Containers Ease Handling of Liquids

Bulk-liquid containers of 300-gal. capacity are now available to processors for inter- or intra-plant handling.

Units (Tote Tanks) have standard drum closures at the top, permitting easy access for filling, cleaning, and inspection. Contents are discharged

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SCIENTIFIC PRODUCTS

NEW

17,000 r.p.m. high speed

***Angle* CENTRIFUGE**

with full instrumentation

An outstanding addition to the most complete line of Centrifuges in the industry!

- Instrumentation is complete—including autotransformer speed control, combination ammeter and electric tachometer, automatic timer, timer cutout switch, low voltage release and pilot light, steel guard bowl.
- Speeds up to 17,000 r.p.m., forces up to 34,390 XG.
- Exclusive remote control—instrument panel easily removed for connection to centrifuge by extension cord.
- Completely sealed 8 x 50 ml head. Adapters available for 10 and 15 ml tubes. Self-balancing controlled drive eliminates need for balancing head.
- Unit is 21 in. high, 14 in. wide, 17 in. deep. ½ H.P. motor. For 115 volts AC, 50-60 cycle single phase.

No. 59855—International Model HT Centrifuge. 8-place head for 50 ml tubes (but without tubes) $745.00

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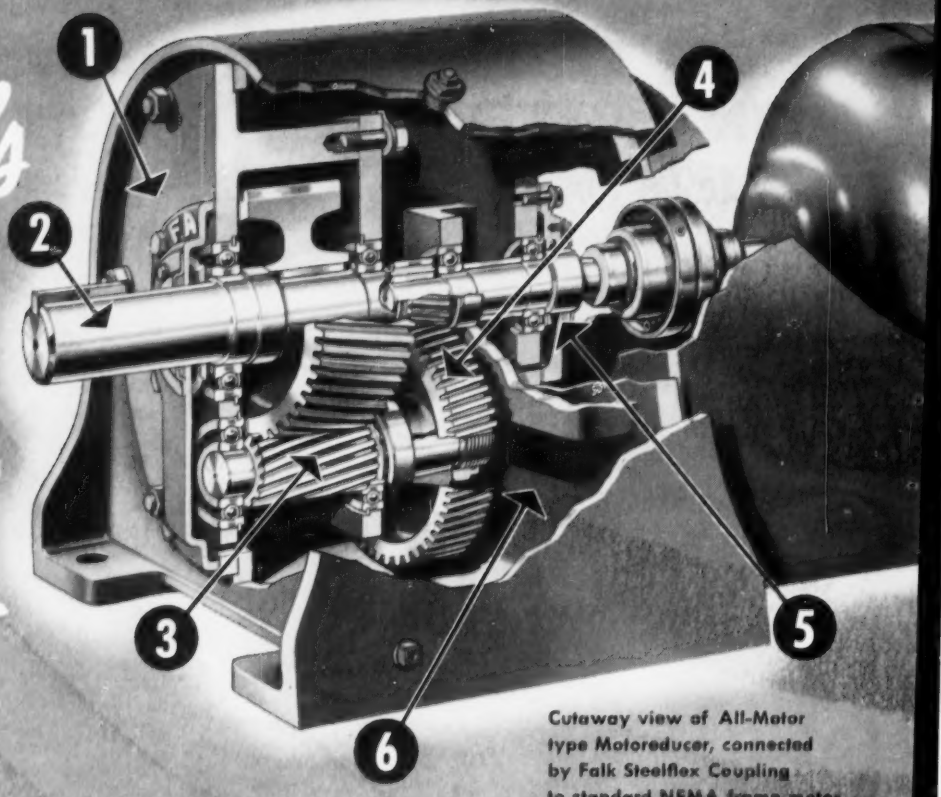


Cutaway view of All-Motor type Motoreducer, connected by Falk Steelflex Coupling to standard NEMA frame motor

WHY Falk Motoreducers give better service—have longer life

Here is the "inside story" behind the all-steel All-Motor type FALK Motoreducer's universal reputation as a gear drive unmatched in quality, efficiency, dependability, ease of maintenance and long life. These "In-built" factors are—

1 **ALL-STEEL HOUSINGS.** Rugged, strong, rigid...all parts are manufactured from heavy steel plate, formed and welded in the Falk Weld Shop.

2 **LARGE OVERHUNG LOAD CAPACITY.** Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum applied loads.

3 **PRECISION GEARING.** Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion. Quiet, crown-shaved pinions.

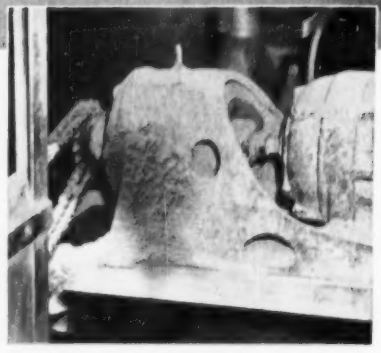
4 **EXTRA-CAPACITY GEARING.** Special extra-capacity gear-tooth form with larger contact area gives greater strength, higher load-carrying capacity.

5 **SEALED HOUSINGS.** Splashproof, dustproof, oil-tight construction. Dual closures and one-way vents keep oil in, dust and moisture out.

6 **POSITIVE LUBRICATION.** Large sump capacity...oiltight construction assures clean lubricant...revolving elements lubricated by direct dip.

When you buy or specify the All-Motor type FALK Motoreducer, you get all these—plus the tremendous advantage of full interchangeability of motors. Switch motors as desired—use any make, style or type of standard foot-mounted motor within the unit's AGMA rating—with a minimum of difficulty or "down time."

Available in sizes up to 75 hp—*with or without motor*—from convenient factory, field or distributor stocks, from coast to coast. **Write for Bulletin 3100.**



60,000 HOURS WITHOUT A FAILURE!

Sixty thousand hours is a lot of hours—but the FALK Motoreducer in the unretouched photo above has served that long without failure or need of repair.

This 3 hp unit is one of over 60 FALK Motoreducers in daily service in an Eastern plant of a large milling company, whose president says, in part:

"One of the main advantages of FALK Motoreducers is their adaptability to any motor. Reducers and motors can be easily interchanged....Our service records confirm the wisdom of our choice of FALK equipment as our standard."

FALK ...a good name in industry

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

either by pumping out from top, or by gravity.

Tanks can be handled by any flat bed conveyance, no special truck body required. They can be hauled in ordinarily stake-body or van-type trucks or trailers, or shipped by rail car.—*Tote Systems, Inc., Beatrice, Neb.*

Circle 160E on Reader Service Card

Quickly Sprays Insulation On Walls, Ceilings

Successful spraying of urethane-foam insulation on walls and ceiling is reported with development of special spray apparatus. Proper training of the operator is a key factor in perfecting this technique.

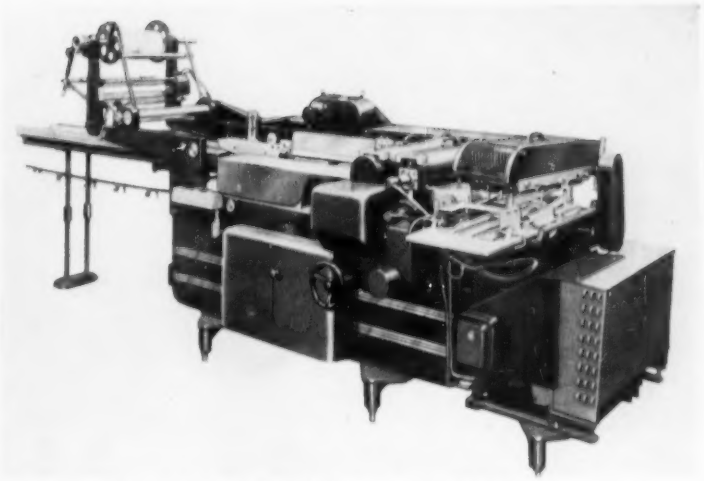
Urethane foam has been used on pipes and tanks of all sizes. While material costs are higher than for conventional insulation, savings in application time are said to result in lower overall cost.

Principal advantages of the new unit are use of a mixing chamber in the gun itself and precise proportioning of material. Metering equipment is attached to the gun by three separate lines, for prepolymer, catalyst, and air.

Flow of material is controlled to ½%. Components are mixed in about 1/30 sec., picked up by atomizing air, and sprayed against the surface. By pushing a button, operator can spray in a continuous stream for foaming-in-place operations. And there is a device that recirculates material to prevent clogging the spray during idling.

For certain applications, it may be possible to automate the gun.—*Minnesota Mining & Mfg. Co., 1000 Fauquier Ave., St. Paul.*

Circle 163A on Reader Service Card



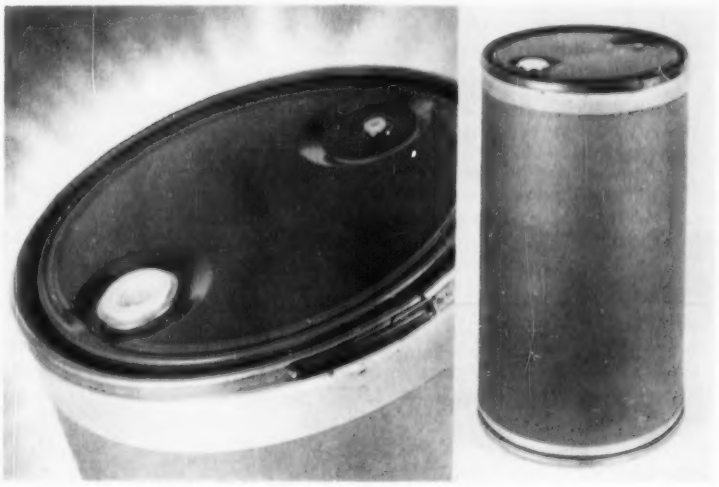
Produces Heat-Sealed Cookie Packs at 125/Min.

Designed especially for automatic high-speed packaging and heat-sealing of wax-paper and glassine wraps, this unit offers highly efficient handling of baked goods and similar items.

Called "Wax Paper" Wrapper, it speeds packaging of items such as cookies, crackers, and biscuits. Whole or fractional-size unit packs may be arranged on edge, stacked, or flat in rows. Various-shaped packs are handled at up to 125 per min.

Unit wraps without boards, trays, or stiffeners—unless desired—and requires only one operator. Feeding and delivery tables are available, along with auxiliary attachments such as code daters and labelers.—*Hudson Sharp Machine Co., Green Bay, Wis.*

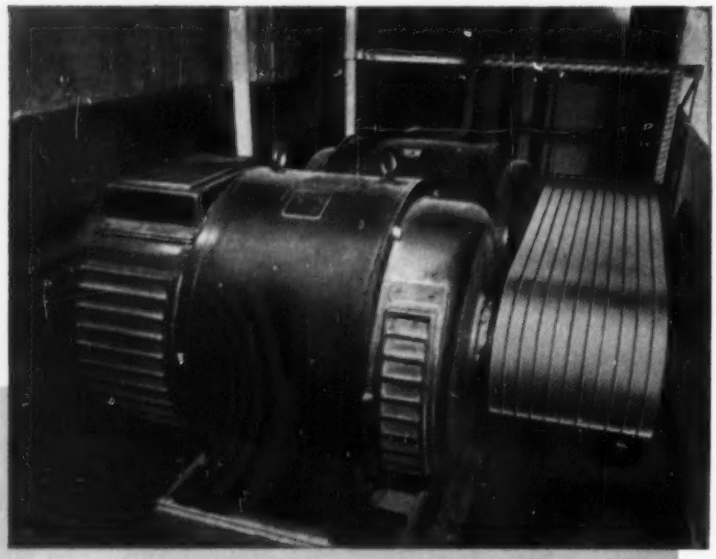
Circle 163B on Reader Service Card



Fiber Drum for Liquids Offers Many Advantages

To users of liquids and semi-liquids, this new fiber drum offers easier dispensing, light tare weight, and superior product protection. Typical applications include packaging of shortening, lard, brined fruits and vegetables, and various meats.

Known as Liquipak, it employs a polyethylene lining as an integral part of the drum. With corrosive contents, its top metal chime can be protected with a polyethylene sleeve



How CONCAVE SIDES cut V-belt costs

By this simple test you can see for yourself how the concave sides (Fig. 1) of the Gates V-Belt lengthen the life of the belt... *thus reducing costs.*

Just bend a Gates V-Belt and feel the sides. You will see that these precisely engineered concave sides have now *become straight*, permitting them to grip the sheave groove evenly. (Fig. 1-A). This assures longer belt life; lower costs.

Fig. 2-A Fig. 2

Now make the same test with a straight-sided belt. (Fig. 2) Notice how the sides bulge out on the bend (Fig. 2-A) concentrating the wear at the points shown at arrows.

These tests should convince you that it *pays* to specify the V-Belt with Concave sides—Gates Vulco Rope...readily available from nearby distributors.

THE CONCAVE SIDE
U.S. PAT. NO. 1813698

TPA 199

Gates Distributors are in the Yellow Pages

World's Largest Maker of V-Belts

The Gates Rubber Co.
Denver, Colorado

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the U. S. and Canada, and in 70 other countries throughout the world.

Gates VULCO ROPE Drives

Equipment & Supplies

heat-sealed to the lining. An insulated fiber sidewall guards against sudden temperature changes during transit or in storage.

Drum also incorporates a liquid-tight bottom crimp, electrogalvanized top and bottom chimes, and either a vinyl- or epoxy-coated metal cover available with or without bungs and vents. A lever-actuated locking device (Leverpak, shown in left photo) makes unit simple to open and reclose, also provides full open top for easier dispensing.

With a tare weight of 24 lb., drums offer lower handling costs. And their uniform size enables easier handling, stacking, and palletizing. —*Continental Can Co., Fiber Drum & Corrugated Div., 530 Fifth Ave., New York City.*

Circle 163C on Reader Service Card

First All-Plastic Gate Valve Ups Operating Efficiency

This pioneering all-plastic gate valve is specifically designed for superior flow control and to curb contamination of lines by corrosive or abrasive liquids.

Called Flex-Plug, it combines for wide versatility the straight-through flow, non-pressure-drop characteristics of a gate valve with the throttling-type flow control of a globe valve. Units are now available in 1 and 2 in. sizes with screwed ends. Ultimately, the line will include ¼-4 in. models. (*turn page*)

Give them appetizing sparkle with fast, low-cost Celite filtration

How GOOD does it *taste?* How good does it *look?* It's all the same to the busy supermarket shopper. That's why so many processors of fruit juices, jellies, cooking and salad oils, syrups and other liquid products are now using Celite* diatomite filtration.

Celite removes the finest suspended solids . . . actually *polishes* your products to a dazzling clarity . . . gives them the looks that sell more shoppers. And it does all this with a minimum of trouble and cost . . . providing almost automatic operation at fastest flow rates when used with any standard pressure filter. Of course, Celite never affects the most delicate flavors.

Celite also gives you important advantages over other diatomites. Its lower wet density means greater filter surface coverage and its higher uniformity provides more consistent results. Get the full story from your nearby Celite engineer or write Johns-Manville, Box 14, New York 16, N. Y. In Canada, 565 Lakeshore Road East, Port Credit, Ontario.

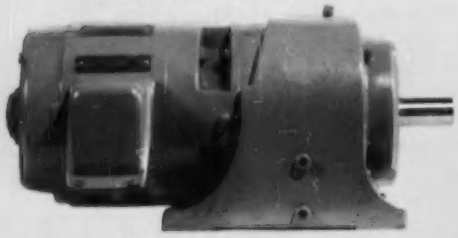
*Celite is Johns-Manville's registered trade mark for its diatomaceous silica product

JOHNS-MANVILLE PRODUCTS

Johns-Manville CELITE diatomite filter aids

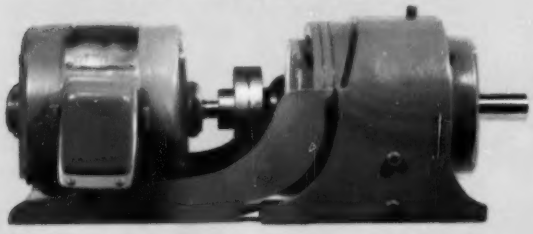
A great gear-motor

NEW integral unit



Compact, one-piece unit has complete, easily removable motor, machined-in alignment.

NEW all-motor unit



Providing wide application flexibility, motor change may be accomplished without disturbing gear.

General Electric's

NEW

gear-motor line

Now, you can meet all your low-speed drive requirements from a brand new line of General Electric packaged power transmissions. This 3-unit line is based on a new, completely simplified, helical design that has evolved from General Electric's 25 years of gear-motor engineering and application experience. And it's a line that can provide you with important, 3-way savings on all low-speed applications.

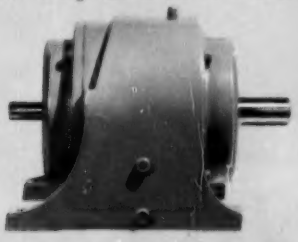
1. **Greater reliability:** This new line incorporates the most advanced gear manufacturing methods and all units are factory tested before shipment. In addition, you benefit because you purchase both motors and gears from a single manufacturer.

2. **Easier Maintenance:** A cinch to assemble and disassemble, alignment is machined right into each unit. Gear components may be carried in stock as sub-assemblies, minimizing downtime for normal repair.

3. **Reduced inventory:** You can reduce your inventory with no sacrifice to your operating continuity. Parts standardization and interchangeability permit a basically lower inventory investment.

This new line was developed to keep pace with the new requirements and wider applications of gear-motors brought about by advanced manufacturing techniques. *Get complete information from your nearest Apparatus Sales Office or Distributor—or write for bulletin GEA-6704, containing line highlights, to General Electric Co., section 851-6, Schenectady, N. Y.* Gear-Motor and Transmission Components Dept.

NEW separate reducer



Unit can provide a variety of output speeds with change of belt or chain rates.

Progress Is Our Most Important Product

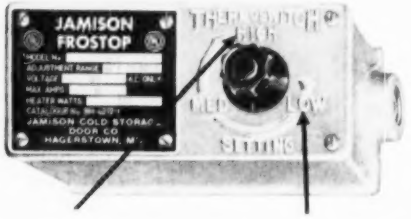
GENERAL ELECTRIC

New Jamison FROSTOP has Adjustable Temperature Control

to prevent icing and freezing shut of cold storage doors

The new Jamison Frostop with adjustable temperature control is now available on Jamison Cold Storage Doors of many types and practically all sizes.

...thermoswitch-controlled temperature range eliminates dangers of overheating or condensation of moisture due to unauthorized shut off.



120°—*above 120° excessive temperature damages frame and gaskets.*

60°—*below 60° condensation will form in cable channels on frame and sill areas.*

Adjustable Frostop thermoswitch permits selection of any temperature between 60° and 120°.

BUILT IN SAFETY RANGE

With the new Jamison Thermoswitch Control, Frostop *cannot* be turned off at the unit, nor can heat be elevated beyond safe limits. Practical temperature range is from 60°F. to 120°F., which prevents moisture condensation or excessive heat.

Other approved features include Gasketed Control Box—water tight and drip proof; and Silicone-Glass Cable Insulation to give cable moisture and heat resistance and extra long life.

Specify Jamison's new Frostop for completely safe control of icing and freezing of doors. Write for new Frostop Bulletin. Jamison Cold Storage Door Co., Hagerstown, Md., U.S.A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

JAMISON

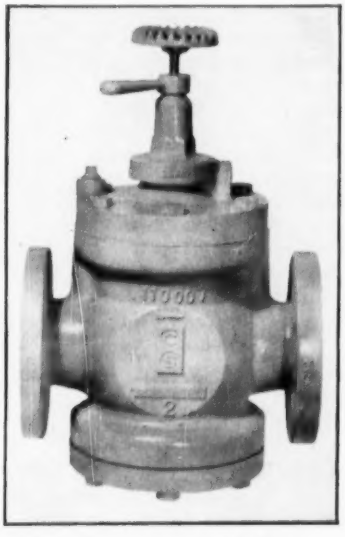
COLD STORAGE DOORS

Equipment & Supplies

Offered in both rigid polyvinyl chloride (PVC) and styrene-copolymer (Uscolite), valve operates by closing a conically shaped plug against a resilient synthetic cap. Latter can be removed quickly and easily replaced without taking valve from line. It is available in either buna N, Neoprene, or Hypalon with Kel F elastomer for special applications. PVC line resists temperatures to 140F, styrene-copolymer up to 170F.

Rated for 200 lb. working pressure, valve also performs efficiently under vacuum.—*Vanton Pump & Equipment Co., 201 Sweetland Ave., Hillside, N. J.*

Circle 164A on Reader Service Card



Piston-Type Steam Valve Has Built-In Strainers

This pressure-reducing and regulating valve, for steam service, has built-in pilot and main valve strainers. Latter curb maintenance and are easily removed for cleaning without having to take the unit from the line.

Known as Type 44, it is a single seat, piston-actuated model. Highly sensitive to small changes in reduced pressure, valve is also available with external sensing line. Maximum inlet pressure is 250 psi. at 400F., delivery pressures range 5-250 psi.

Sizes are 2, 2½, 3, and 4 in. with iron body and flanged ends.—*A. W. Cash Co., P. O. Box 551, Decatur, Ill.*

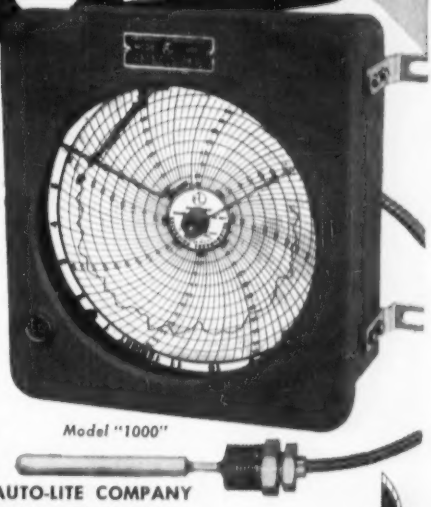
Circle 169A on Reader Service Card

AUTO-LITE

TEMPERATURE RECORDING...

Newly designed, Model "1000" Auto-Lite Recorder gives permanent proof of temperature behavior. • 6" clear reading chart; various standard ranges from minus 40°F. to plus 550°F. • 3 standard types; choice of 24-hr. or 7-day cycle. • Electric or mechanical chart drive. • With capillary tubing for remote reading. Priced from $49.50.

Send for new catalog describing many styles of Auto-Lite temperature Recorders and Indicators.



Model "1000"

THE ELECTRIC AUTO-LITE COMPANY
INDUSTRIAL THERMOMETER DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

TEMPERATURE RECORDERS

CY BELT says

"I can increase your production and profit!"

In some plants, production is held up because of delays in moving material from one processing stage to another. If this happens, even occasionally, in your plant, perhaps an analysis of your present method of handling materials could show you where and how to eliminate time-wasting procedures. A Cyclone Conveyor Belt representative will be glad to help you make such an analysis, without obligation to you. Because Cyclone Metal Conveyor Belts are made in many sizes, designs and materials, his recommendation will be tailored to the needs of *your* plant and *your* product. Why not fill in the coupon below?

USS CYCLONE METAL CONVEYOR BELTS
SPIRAL WOVEN
FLAT WIRE · FLEX-GRID

CYCLONE FENCE DEPARTMENT
American Steel & Wire Division
United States Steel Corporation, Waukegan, Illinois
United States Steel Export Company, New York

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Cyclone Fence
Dept. H-127, Waukegan, Illinois

Please have your trained representative call on us to discuss our production problems.

Name .....
Company .....
Address .....
City ..... State .....

UNITED STATES STEEL

From One Engineer To Another...

Soluble Coffee Problem:

We must have a highly sanitary Heat Exchanger to safeguard the delicate flavor of our coffee product. The heat exchanger must be easily cleaned . . . and operate at high pressure.

Case Histories Available on:
- APPLE JUICE
- APRICOT JUICE
- BABY FOODS
- BARB'Q SAUCE
- BEER
- CITRUS JUICES
- COFFEE (soluble)
- Concentra'd Juice
- Cranberry Juice
- EDIBLE OILS
- EGG (liquid)
- GELATIN
- GRAPE JUICE
- GRAVY
- HONEY
- ICE CREAM MIX
- LARD
- MILK
- MOLASSES
- ORANGE JUICE
- PECTIN
- PIE FILLINGS
- PICKLE BRINE
- PINEAPPLE Juice
- PRUNE JUICE
- SOFT DRINKS
- SOUPS
- STARCH PASTE
- SUGAR SYRUPS
- TOMATO JUICE
- TOMATO PASTE
- VEGETABLE OIL
- VINEGAR

and many others

Enter the APV ENGINEER . . .

with years of experience and know-how accumulated through serving the world's largest juice and food processors.

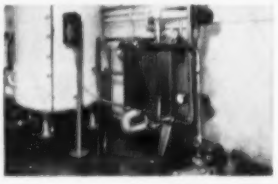
SOLUTION:

Use APV model HX with a high pressure stainless frame (up to 100 PSI) with Self-Cleaning, Type 316 stainless Paraflow plates that resist fouling—permit easy cleaning. Maximum sterility is guaranteed. Cooling and chilling is accomplished in a single unit with great economy of coolant.

Q.E.D.

Get all the facts on **PARAFLOW Plate Heat Exchangers**

See us at the CANNER'S SHOW in Atlantic City BOOTH NO. 18 Juice Ave.



APV PARAFLOW SERVES THE WORLD'S LEADING FOOD AND JUICE PROCESSORS

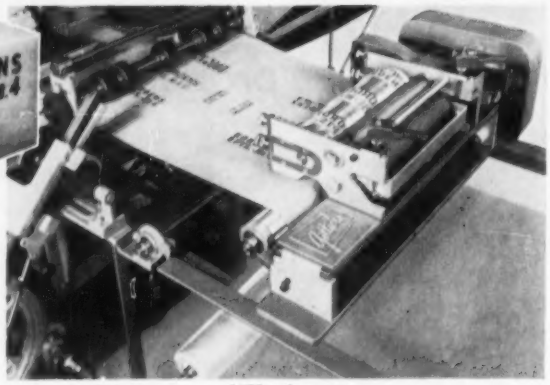
Write for descriptive folder F-57

APV COMPANY, INC.

137 ARTHUR ST. BUFFALO 7, N. Y.

Now... an efficient, economical way to

IMPRINT WRAPPERS AS YOU PACKAGE



Compact Gottscho "Rolaprinter"® Attachment Fits All Wrapping and Bundling Machines

Ideal for imprinting anything from a code-date on a preprinted wrapper to complete display copy on 5 sides of a bundle overwrap. Fully automatic . . . requires no attention during operation, synchronizes with parent machine at regular production speeds . . . provides accurately positioned imprint. A miniature flexographic printer, the ROLAPRINTER attachment uses fast-drying liquid inks of any color and stick-on rubber type or dies. Assures consistent quality on all *films, foils* and *papers*. Mechanically simple . . . copy changes and adjustments for different wrapper sizes can be made quickly by untrained personnel. Models available to imprint areas from 1" to 24" wide.

For complete information please submit details of your requirements, including make and model of wrapping machine.

Gottscho

ADOLPH GOTTSCHO, INC.

Dept. G, Hillside 5, N. J.

In Canada: **RICHARDSON AGENCIES, LTD., Toronto & Montreal**

Automatic Production-Line **CODING, MARKING, IMPRINTING MACHINES**

Equipment & Supplies

Automatic Traveling Crane Operates Runway Door

Here is a new overhead traveling crane that opens and closes doors automatically.

Unit (All-State) can be used throughout the full length of runway without any interference from door or building construction. In passing in or out of building, crane attaches itself to runway door, pushes it to end of runway, and disengages. Door may then be anchored in place at end of runway as long as desired.

To close the opening, operator merely eases crane against door and pulls it back to the building. Door then disengages itself from crane and assumes its proper position.—*All-State Engineering Co., 7116 N. 76th St., Milwaukee.*

Circle 170A on Reader Service Card

INGREDIENTS

All-Purpose W/O Emulsifier Ups Product Stability

Emulsions that will not separate at temperatures to 200 F. may now be prepared with use of a new water-in-oil emulsifier.

Called Emocithin, it offers numerous food applications: Improving margarine stability, curbing the staling of baked goods, preventing water separation in fatty foods, upping the spreadability of pan greases, and enhancing organoleptic qualities of many items.

Food-grade product is a semi-solid available in 60-lb. cans. It is easily incorporated into fats and oils by warming and blending. Quantities used range ½-2% of oil content.—*Morningstar, Nicol, Inc., 630 W. 51 St., New York City.*

Circle 170B on Reader Service Card

Equipment & Supplies

Versatile Flavor Intensifier Boosts Foods' Appeal

Flavor of many processed foods may be enhanced by special intensifiers containing varying amounts of MSG, a blend of spice extractives, dextrose, and/or salt.

Products (Flavotang) are recommended for use in processed meats, frozen foods, hamburgers, steaks, stews, soups, gravies, and sauces. Specific quantities required vary with the end product and particular flavor character desired. However, 6-12 oz. are generally used per 100 lb. of finished product.

Material is available in 200-lb. lots.—*Dodge & Olcott, Inc., 180 Varick St., New York City.*

Circle 171A on Reader Service Card

CHEMICALS

Special Filter-Aid Blends Boost Product Clarity

New blends of filter aids, incorporating specially processed asbestos fiber, offer higher product quality and more efficient filtration.

Called Fibra-Flo, products are available in a range of flowrate and clarity properties, based on asbestos content and grade of diatomite employed. They may be used both as precoats and main body feeds.

As a precoat, material protects the filter septum and permits easier separation of cake. Screen imperfections do not prevent coating, which may be done at higher-than-normal flowrates.

Polishing of beer is a prime application. Here, these filter aids are said to cut costs by eliminating the old pulp-filtration method.—*Johns-Manville Corp., Box 14, New York City.*

Circle 171B on Reader Service Card

New Wall Finish Protects Freezer-Room Insulation

Board-type insulation, particularly in low-temperature freezers and coolers, may be efficiently guarded by a new white wall finish.

Known as Adcote, it provides excellent resistance to moisture, chemicals, pests, and mold. In addition, it is highly fire-retardant. Supplied as a two-component product—a dry powder and a liquid, mixed just prior

Low-cost quality insurance . . .

Filter liquid sugar...

TURBIDITY

... out of your processing picture

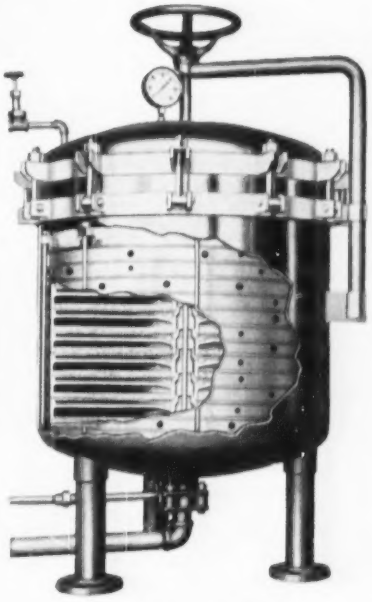
You can eliminate liquid sugar turbidity which may be impairing your product's flavor, aroma, clarity and shelf-life, *quickly and economically* in your own plant, with a Sparkler Horizontal Plate Filter—the refiner's own choice for reliable, efficient polishing performance.

Sparkler's *exclusive* horizontal plates provide complete stability to the cake with no danger of cracking or break through, even with pressure variation or complete shutdowns and start-ups. A thin even pre-coat can be applied to Sparkler's horizontal plates with low pressure, and a low density, porous cake built-up to assure high flow with fine sharp filtration throughout the cycle.

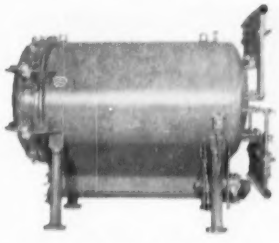
Completely stainless steel filters having access to all plate surfaces for thorough cleaning fulfill food industry sanitation requirements.

Design variations of the Standard Horizontal Plate Filter enable sugar units to be offered in a wide range of models and capacities at economical prices.

WRITE SUGAR DEPT. for additional information on Sparkler's complete line of sugar filtration equipment.



The SPARKLER Standard Horizontal Plate Filter



The SPARKLER RSC sugar refinery filter

SPARKLER FILTERS

SPARKLER MANUFACTURING CO.
Mundelein, Illinois

Sparkler International Ltd.
Plants in Canada, Holland, Italy and Australia.

Representatives in principal cities throughout the world

Filtration Engineering Exclusively for Over 30 Years

OUTSTANDING METAL PACKAGING

HEEKIN

Product Planned

CANS

OUTSTANDING SERVICE

The use of Heekin Product Planned Cans . . . lithographed or plain . . . for your products makes your business an integral part of Heekin. In its fifty-six years Heekin has served thousands of customers . . . in every field of merchandising. We acknowledge no superior in the production of metal cans . . . in personal service . . . in creative ability . . . and in economic and merchandising co-operation.

Let Heekin Product Planned Cans work for you.

THE HEEKIN CAN CO. *PLANTS IN OHIO, TENNESSEE & ARKANSAS—SALES OFFICES; CINCINNATI, OHIO; SPRINGDALE, ARKANSAS*

to use—material is usually applied by trowel. However, it may also be brushed on or sprayed with special equipment.

On most surfaces, product is generally applied in two coats to a thickness of about ⅛ in. It can be finished in varying degrees of smoothness, and painting is not necessary because of product's whiteness stability.

In addition to use on insulation, tests indicate other applications for the material, such as refinishing of interior concrete surface or brick walls.—*Swift & Co., Adhesive Products Dept., 4200 Packers Ave., Chicago.*

Circle 171C on Reader Service Card

BRIEFS

Vacuum Packager for smaller meat and cheese processors turns out 1-lb.-size packages at 15 per min. Machine (Royal-Vac) handles pouches to 11½x22 in.—*Royal Packaging Equipment, Inc., 1406 Bergen Blvd., Fort Lee, N. J.* (173A)

Piston-Type Filler dispenses semi-solids and liquids to be frozen in aluminum trays (3¾ x 3 x 1½ in. to 9 x 6½ x 4½ in.) and pans (5¾ in. dia. x 1½ in. deep). Typical items: Mashed potatoes, chicken a-la-king, sauces, and cole slaw. Machine has 'no container-no fill' arrangement, and can be equipped for depositing two products into a tray.—*Hope Machine Co., 9400 State Rd., Philadelphia.* (173B)

'Package' Boilers offer flexible installation, space-saving design, centralized controls, and ease of maintenance. Units (Model R) are available in 10-150 hp. for pressures to 250 psig., and for oil, gas, or combination oil-gas firing. All wiring and piping to boiler components are completed at the factory.—*Ames Iron Works, Inc., Oswego, N. Y.* (173C)

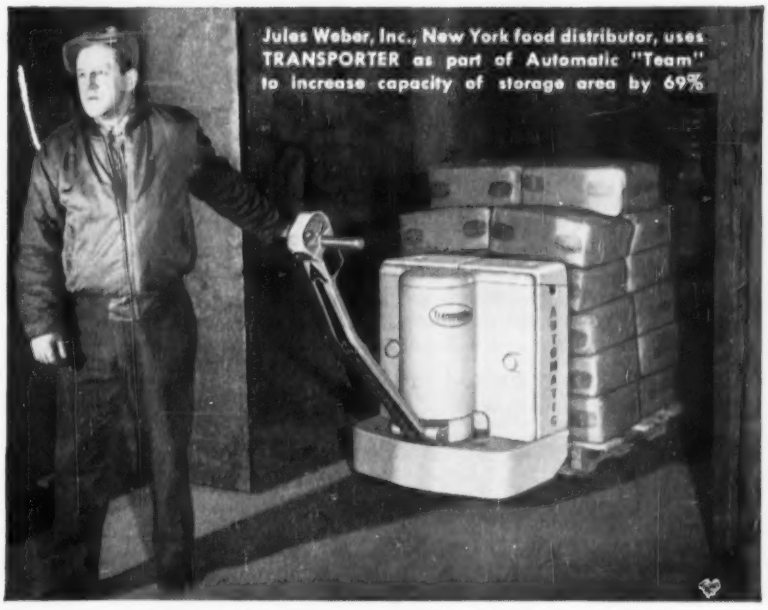
Ultrasonic Cleaning Unit, consisting of compact generator and transducerized tank, speeds thorough cleansing, degreasing, and descaling of various small parts. Stainless-steel tank (Model DR 50-AH) is 9 in. high, 5¾ in. wide, and 5¾ in. deep.—*Acoustica Associates, Inc., 26 Windsor Ave., Mineola, N. Y.* (173D)

Circle key numbers on Reader Service Card

Automatic TRANSPORTER

LEADS ITS FIELD IN COMPACTNESS...

EFFICIENCY...ECONOMY...


Jules Weber, Inc., New York food distributor, uses TRANSPORTER as part of Automatic "Team" to increase capacity of storage area by 69%
AUTOMATIC

Automatic TRANSPORTERS are available in many different types...low and high lift platform or pallet...fork, straddle and retractable mast type stackers...tractors. These short, compact, trucks perform all handling functions of standard rider type trucks, yet cost considerably less.

In all models, the flexibility, economy and dependability of electric power at its best are combined with many exclusive operating advances. Capacities range from 1,000 to 10,000 lbs. depending upon the model. A complete line of attachments is available.

But see for yourself the superiority of Automatic TRANSPORTERS. Figures below are for low lift pallet model comparison but other TRANSPORTERS are equally impressive.

CAPACITY...	TRANSPORTER 4,000 LBS.	TRUCK A 4,000 LBS.	TRUCK B 4,000 LBS.	TRUCK C 4,000 LBS.	TRUCK D 4,000 LBS.
SHORTER — Overall length less load...	21⅛"	25¼"	26⅛"	23¾"	24"
MANEUVERABLE — Maximum Overall width	29"	32"	32"	27"	32¼"
BETTER INCHING CONTROL — 3 Speed Control	Yes	No	No	No	No
MAXIMUM HEAT PROTECTION — Class H Silicone insulated motor	Available	No	No	No	No
MORE EFFICIENT — Hand or foot lowering control	Both	Hand Only	Hand Only	Hand Only	Hand Only

WRITE TODAY FOR SPECIFICATIONS & CASE HISTORIES of installations similar to your own. Also get the facts about Automatic's exclusive lease or purchase plan.

AUTOMATIC TRANSPORTATION CO.

Division of The Yale & Towne Manufacturing Company

Dept. X-7, 125 West 87th Street, Chicago 20, Illinois

For more data, circle this page number on card at back →

PUR-O-TEX and WHITE CONVEYOR are white, non-toxic belts. Food products are conveyed on them without absorbing any taste or odor. These Ton-Tex belts are made of plies of cotton duck treated with special compounds. They withstand mild abrasion, and can be washed and kept clean. Ton-Tex belting is permanently pliable and can be vulcanized endless.

PUR-O-TEX resists water, heat, oils. It is extensively used by bakeries, food shops, restaurants, fish and meat packers, fruit and vegetable processors.

WHITE CONVEYOR handles food products that are free from oils and greases.

● *Write us if you have conveyor applications that require the utmost in sanitation.*

TON-TEX CORPORATION, GRAND RAPIDS 2, MICH.

31 COLUMBUS AVENUE, ENGLEWOOD, NEW JERSEY — 759 W. SAN CARLOS STREET, SAN JOSE 26, CALIFORNIA

TON-TEX CONVEYOR AND TRANSMISSION BELTING

STEEL

Every Kind

Quick Delivery

Plates, Structurals, Bars, Sheets, Tubes, etc. Carbon, Alloy, Stainless Steels, Babbitt Metal.

RYERSON

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Wallingford, Conn., Philadelphia, Charlotte, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Milwaukee, Chicago, St. Louis, Seattle, Spokane, Los Angeles, San Francisco

Choose Metso silicated detergents for thorough grease, oil, protein removal and also for safe cleaning of all equipment. Metso curbs corrosion on tin, aluminum, copper, etc. (Important when detergent mixtures contain corrosive alkalies and synthetics).

Mailed on request "Cleaning in Food Industries"

PHILADELPHIA QUARTZ COMPANY

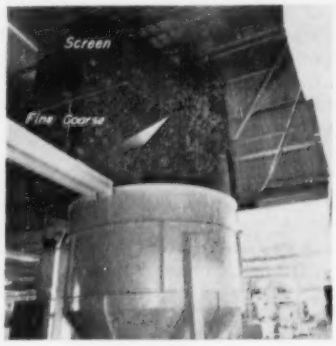
1148 Public Ledger Bldg., Philadelphia 6, Pa.

TRADEMARK REG. U. S. PAT. OFF.

METSO DETERGENTS

DISTRIBUTORS IN OVER 65 CITIES

EQUIPMENT APPLICATIONS



Gets Required Sugar Grain By Automatic Screening

In-plant screening of granulated sugar at John Sexton & Co., Chicago, has solved a purchasing and storage problem.

Ordinarily, processing of powdered and gelatin desserts, which calls for fine-and coarse-grain sugar, respectively, would entail separate handling of the two items. However, automatic screening separates the granulated sugar as required, and one man controls delivery to process.

This feature is part of an extensive bulk-handling system (J. C. Corrigan Co., 41 Norwood St., Boston) that automatically meters sugar to three remote areas—gelatin, pickle, and preserve departments.

Screened sugar (fine and coarse) is stored in two surge bins on the side of a 210,000-lb. main storage tank (photo). Demand for either grade automatically starts mechanical feeding of sugar to the screen. Any excess is conveyed to a surge bin supplying other departments, which eliminates the need for re-screening.

Circle 174A on Reader Service Card

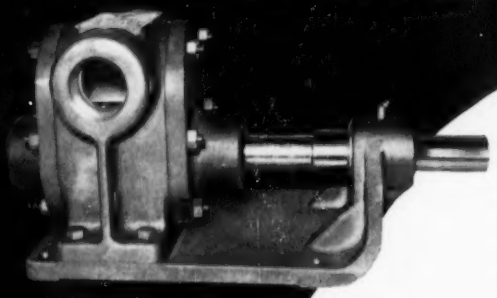
Automatic Case Stackers Eliminate Use of Pallets

Pallet-less handling of unit case loads has upped production and simplified warehousing at Minneapolis Brewing Co. And of course, there is no investment in pallets.

In operation, cases of uniform dimensions are automatically arranged by special loading machines (Unit Loaders, Alvey Conveyor Mfg. Co., 9313 Olive Street Rd., St. Louis). Cases are then fed to off-bearing conveyors, from which loads are picked up by lift trucks with grab arms.

Circle 174B on Reader Service Card

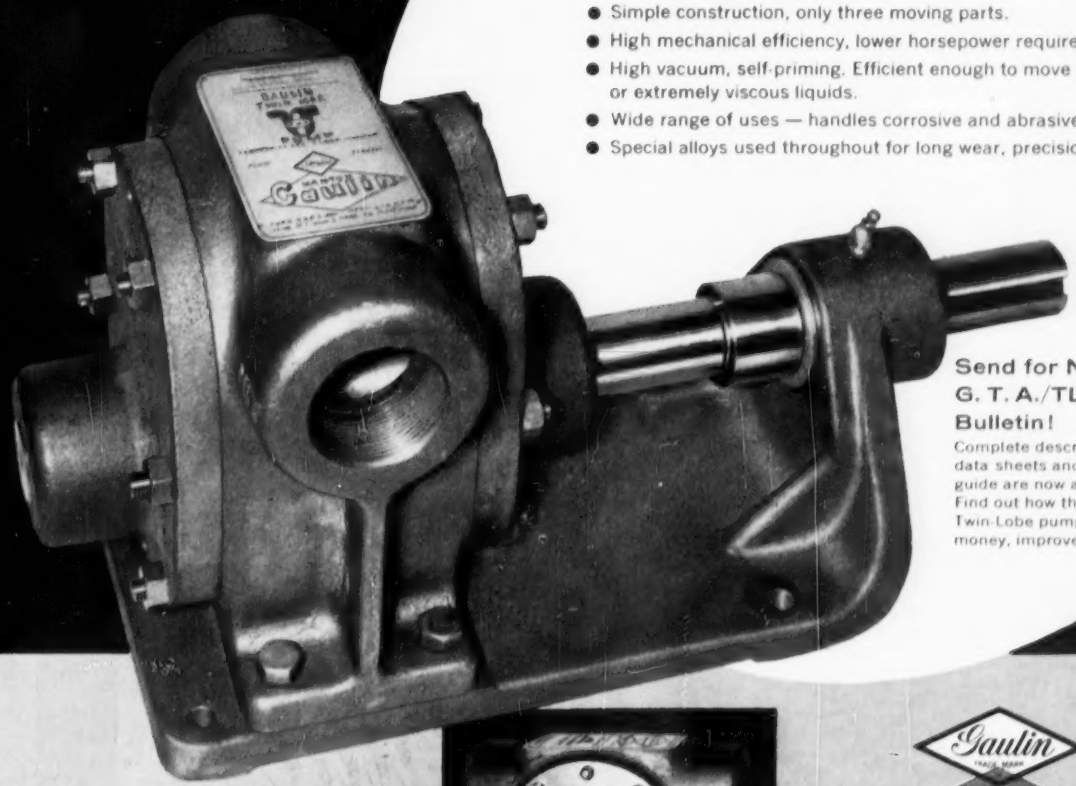
NEW TWIN-LOBE® Positive Displacement PUMP*



Manton-Gaulin presents a completely new concept in rotary positive displacement pumping — The Gaulin Twin-Lobe*® design.

The two big features are simplicity and performance — results of a radically new "Twin-Lobe" pumping principle. Look at these advantages:

- Simple construction, only three moving parts.
- High mechanical efficiency, lower horsepower required.
- High vacuum, self-priming. Efficient enough to move volatile gases or extremely viscous liquids.
- Wide range of uses — handles corrosive and abrasive materials.
- Special alloys used throughout for long wear, precision fit.



Send for New G. T. A./TLP-57 Bulletin!

Complete description, data sheets and application guide are now available. Find out how the new Twin-Lobe pump can save money, improve quality.

One Basic Design good for many uses

Liquids, heavy slurries, pastes, soft food solids, emulsions, gases, and light non-lubricating liquids

*Pat. Pending

Capacity and size range

Three models now available. Capacities: 0-56 gpm; Pressures: 0-200 psi.

Gaulin

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World's largest manufacturers of stainless steel reciprocating, rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills.

In the mind of the consumer brilliant clarity, for many food products, is inseparably linked with high quality... the point is so well established as to need no discussion. To gain this sparkling clarity, which may require the removal of unwanted solids even down in the colloidal and bacterial size range, Dicalite Filteraids have no superior ... a fact established in many impartial laboratory tests and in the daily experience of leading producers in the food, sugar and beverage fields.

Since there are 8 Dicalite Filteraids, differing in particle size and range, practically any liquid can be filtered to desired clarity at economically fast flowrates. Since Dicalite is processed from highest-grade diatomite, it is both physically and chemically stable... it is sterilized in processing, and cannot affect characteristic flavor or aroma.

Brilliant clarity—stability of finished product—lowest filtration cost ...these are the reasons why many processors have selected Dicalite Filteraids for all their processing.

Write for Information.

Dependable GLC GREAT LAKES **Dicalite®** DIATOMACEOUS MATERIALS

Dicalite Division, Great Lakes Carbon Corp., 612 S. Flower St., Los Angeles 17, Calif.

JUST OFF THE PRESS

PLANT ENGINEERING

Can Filler

Describes can filler for milk, ice cream mix, or cream. Bulletin G-535, 4 p.—*Cherry-Burrell Corp., Chicago.* (177A)

Electro-Caloric Flowmeter

Reprint describes flowmeter to handle practically any liquid or gas. 18 p.—*Industrial Development Labs, Jersey City.* (177B)

Liquid Level Gage

Describes safe, accurate gage for explosive or inflammable liquids. Data Unit #306, 2 p.—*Jerguson Gage & Valve Co., Burlington, Mass.* (177C)

Midget Size Solenoid Valves

Presents expanded line of 3-way tiny solenoid valves that now includes ¼ in. pipe connections. Bulletin 8314, 2p.—*Automatic Switch Co., Florham Park, N. J.* (177D)

Improved Diaphragm Pump

Explains improved diaphragm of adjustable stroke pump. Longer stroke and life of diaphragm, as well as higher capacity are reported. Bulletin P8-B10, 2p.—*Denver Equipment Co., Denver Colo.* (177E)

New Trip Control

Electric two-hand clutch control for industrial machines. Catalog 65,—*Micro Switch, Freeport, Ill.* (177F)

Air Filters

Describes line of filters for science and industry. 8 p.—*Flanders Filters, Inc., Riverhead, N. Y.* (177G)

Geared Flexible Couplings

Pertinent application and selection data for couplings with maximum bores of 7 in. and ratings from 2½-572 hp. per 100 rpm. Book 2775, 12 p.—*Link-Belt Co., Chicago.* (177H)

Heat Exchangers

Illustrates general uses and installation of shell and tube equipment. Bulletin #949, 28 p.—*The Pfaudler Co., Rochester, N. Y.* (177I)

Unit Heaters

Information on installation and care of unit heating equipment. *Bulletin No. 12, 4 p.—Denham & Co., Detroit.* (177J)

Electric Disk Clutches

Gives inside story on electromagnetic disk clutches stated to provide simplicity, compactness, and reliability for power transmission control. Bulletin 503, 4p.—*Stearns Electric Corp., Milwaukee.* (177K)

Redesigned Electric Brake

Breakdown drawing illustrates new features in redesigned electric disk brake. Form SK 4896, 8p.—*Star-Kimble Industrial Motor Div., Hamden, Conn.* (177L)

Heater for Storage Tanks

Contains various hook-ups of electric heaters for storage tanks handling viscose fluids. Nomographs make calculation of heat requirement easy. Supplement 202A, 8p.—*Hynes Electric Heating Div., Mountainside, N. J.* (177M)

Tight Closing Control Valves

Introduces a series of control valves that are stated to embody excellent balance and accuracy of control, as well as single-seated tight-closing construction. Includes drawings, tables and charts. Catalog 307, 6p.—*Schade Valve Mfg. Co., Philadelphia.* (177N)

Stainless Lavatory

Contains over 2200 items used in meat processing and packing, including new stainless lavatory with removable sterilizing units. Catalog 89, 100 p.—*Koch Supplies, Kansas City.* (177O)

Vacuum Pumps and Blowers

Provides details on blowers, gas pumps, and vacuum pumps, including relief valves, timing gears, and thrust bearing assemblies. Equipment and disassembled parts are shown in 22 photos. Bulletin S-59F, 8p.—*Sutorbilt Corp., Maywood, Calif.* (177P)

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Amazingly compact, yet big in output, Gyro-Whip Sifters save floor space. Simplified design reduces maintenance and cleaning time and makes possible the most rigid standards of sanitation.

The average Gyro-Whip is only 48" high, requires only 3½' x 3½' floor space, and operates on only ¾ h.p. Bolting areas range from 47.5 up to 95 sq. ft.

These Gyro-Whip Sifters are available in sizes from 3-sieve to 20-sieve mounted models. Also available are free-swinging supersifters with as many as 180 sieves. Can sift from 2 mesh up to 325 mesh. Stainless steel and wood construction. Aspirator tips to air wash graded products can be provided. Installation can be on the stream. It is a self-contained unit, ready to be bolted down and connected to existing spouting.

Write for Bulletin 135-A.

PR/908-P

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Gas-Fired Steam Boiler Plant

Well organized bulletin in color fully describes vertical, gas-fired steam boiler plants that are stated to be completely packaged and automatic, functionally designed with over-drive efficiency, ruggedly built with maintenance-saving fire tubes, and manually operatable if controls or electricity fails. Specifications are listed for many styles of units running to 125 hp. Bulletin A-111, 18p.—*Eclipse Fuel Engineering Co., Rockford, Ill. (178A)*

Unit Air Heater Manual

Treats, in detail, technical aspects of unit heaters. Contents include details of construction, typical specifications, application revealing heat loss estimates, location of units, sound ratings, and mounting heights and throw. Many charts and tables aid the presentation. Selection information and piping and wiring diagrams are also included. Catalog 1523, 26p.—*Westinghouse Electric Corp., Hyde Park, Boston. (178B)*

Automatic Valves

Photos show each unit of a line of pressure-reducing and regulating, relief, back pressure, and control valves. Also controllers, differential regulators, oil-pumping units, governors, combination and temperature regulators. Several examples of complete control systems are shown. Bulletin S-730-1, 8p.—*A. W. Cash Co., Decatur, Ill. (178C)*

Program Controller

Describes "plug-in" controller for simplifying receiving, recording, programming of process variables. Product Spec. E99-6, 2 p. —*Bailey Meter Co., Cleveland. (178D)*

Stress Rupture Data

Furnishes stress rupture data on tubing steels at elevated temperatures and pressures. Bulletin TDC-153B, 4 p.—*Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa. (178E)*

Steam Traps

Explains how Crane inverted open float trap works to remove condensate. Includes tables and instructions for selecting traps. Folder AD-2261, 6 p.—*Crane Co., Chicago. (178F)*

Air Compressors

Folders cover entire line of Westinghouse unit type and Le Roi stationary air compressors. S-101C, S-105B, S-105-2B, 6 p.— *Le Roi Div., Westinghouse Air Brake Co., Milwaukee. (178G)*

Plastic Pipe

Describes strong, light, corrosion resistant plastic pipe, sheets, rods, and fabricated parts. Bulletin 80-3, 12 p.—*Joseph T. Ryerson & Son, Chicago. (178H)*

Solids-Liquid Separation

Information on uses of wire cloth, filter cloth, perforated metal sheets, etc. Catalog 57, 32 p.— *Multi-Metal Wire Cloth Co., New York City. (178I)*

Dust Control

Explains economies of dust control with unitized dust collectors. —*KP-5, Torit Mfg. Co., St. Paul, Minn. (178J)*

Dust Collector

Reprint describes 2-stage, cyclone-and-precipitator dust collection system. 4 p.—*Buell Engineering Co., New York City. (178K)*

INSTRUMENTS

pH Meters, Electrodes

Five bulletin package includes simplified chart, completely indexed and illustrated, that guides users in selecting correct pH electrodes. Also presents information on several types of pH meters. Bulletin 86-5, 13p.—*Beckman Instruments, Inc., Fullerton, Calif. (178L)*

Instrument-Air Dryers

Describes adsorptive type, automatically regenerated dryers for instrument air. *Bulletin 857*, 4 p. —*Anders-Lykens Corp., Div. Milton Roy Co. Philadelphia. (178M)*

Control Instruments

Fully electronic process control instruments are comprehensively described in a series of four bulletins. *Bulletin Series A-801*,—*The Swarthout Co., Cleveland. (178N)*

Vapor Fractometers

Gas chromatography instruments, including flow schematics, sampling features, applications and specifications. Brochure "Vapor Fractometers," 24 p.—*Perkin-Elmer Corp., Norwalk, Conn. (178O)*

Dial Thermometers

Units actuated by specially processed hi-metallic helix that responds rapidly to temperature changes. *Catalog No. 225C*, 11 p. —*Moeller Instrument Co., Richmond Hill N. Y. (178P)*

High Temperature Control

Application and operation of Model HL 15-10 indicating a high temperature limit control. *Bulletin No. 311*, 3 p.—*The Partlow Corp., New Hartford, N. Y. (178Q)*

MAINTENANCE

Chemical Floor Hardener

New product for chemically hardening and dust proofing concrete floors. *A.I.A. File No. 3-B-1, 4 p.—L. Sonneborn Sons, Inc., New York City. (179A)*

Silicone Sponge Rubber

Properties, specifications, shapes, and uses of non-absorbing closed cell silicone sponge rubber. *Bulletin SP-57, 2 p.—The Connecticut Hard Rubber, New Haven. (179B)*

Dual Output Lubricator

Describes Type AP Lubricator, which provides for two independent systems on a single machine. TR-57B, 1 p.—*Bijur Lubricating Corp., Rochelle Park, N. J. (179C)*

Flexible Plastic Pipe

Shows specifications, applications, and installation procedure for a line of heavy-duty flexible plastic pipe and fittings. Includes picture-keyed price listing. Catalog 401, 12p.—*Orangeburg Mfg. Co., Orangeburg, N. Y. (179D)*

Pipe Insulation

Describes Styrofoam pipe insulation stated to have low "K" factor, permanent moisture resistance, easy installation, and low cost. Each shipment contains the specified amount of pipe covering, required steel bands, ground-up insulation for fill, and a fastening tool. Easy-to-follow instructions enable unskilled crews to make the installation. Form 2276, 8p.—*Creamery Package Mfg. Co., Chicago. (179E)*

Special Conduits

Treats of conduit constructed of spiral wire covered with choice of fabrics. Applications and accessories are shown and prices are listed. Bulletin 70, 8p.—*Callahan Zinc-Lead Co., Inc., New York City. (179F)*

Stainless Fasteners

Illustrates 37 fasteners, including sizes, threads, head and point styles, and grades of SS. 8 p.—*Allmetal Screw Products Co., Garden City, N. Y. (179G)*

MATERIALS HANDLING

Steel Bridge Ramps

Illustrates and describes all-steel welded bridge ramps. *Eng. Bulletin 310-30, 2 p.—Roll-Rite Corp., Oakland, Calif. (179H)*

Conveying Systems

Illustrates and describes various conveying systems. *Bulletin, "A-F Apron Conveying Systems,"—The Alvey-Ferguson, Cincinnati, Ohio. (179I)*

Handling Materials

Documented photo-stories concerning various handling problems and their solution. Handling Materials Illustrated. — *Towmotor Corp., Cleveland, Ohio. (179J)*

Industrial Towing Tractors

Outlines engineering, design and construction features, operating data and specifications of recently introduced TG—45 and TG—50 industrial tow tractors. *Bulletin 337A, 4 p.—Allis-Chalmers Manufacturing Co., Milwaukee. (179K)*

Electric Lift Truck

Brochures discuss revolutionary concept of an electric fork lift truck. One covers specifications and drawings, the other gives pictorial description. *Bulletins 6501A and 6503-A, 4 p. each—Automatic Transportation Co., Chicago. (179L)*

Materials Handling Cases

How various manufacturers solved production, storage, and shipping problems with modern materials handling equipment. *"Case Studies of Lewis-Shepard Master Trucks", 28 p.—Lewis-Shepard Products Inc., Watertown, Mass. (179M)*

PACKAGING

Versatile Packaging Machine

Gives complete information on the entire line of Wrap-King packaging machines including changeover parts that allow any shape to be wrapped on the same machine. 10 p.—*Wrap King Corp., Holyoke, Mass. (179N)*

Bag Packer

Operation of Impacker model G-73 for packing feeds in cotton, burlap and jute bags is described, and specifications listed. *Product Data Sheet 5702, 2 p.—Richardson Scale Co., Clifton, N. J. (179O)*

Slice Separator

Includes comprehensive technical data, specifications, and illustrations on food slice separating machine. Bulletin 657,—*Stephens-Adamson Mfg. Co., Aurora, Ill. (179P)*

Steel Strapping Machines

Three booklets illustrate a line of hand-operated strapping tools and accessories for tieing up cartons and crates. Also included are application photos and illustrated step-by-step instructions. Forms 550-201, 710-101D, 710-600B, 22p.—*A. J. Gerrard & Co., Melrose Park, Ill. (179Q)*

Draw from the Nutting Library of Material Handling Helps

Jr. Catalog 58 G—General Purpose, Warehouse Trucks, Casters and Wheels
Bulletin 48 JS—Jacks and Skids for Mobile Storage
Bulletin 54 DJ — Dairy Industry Trucks
Booklet 57 S—General Purpose Trucks and Barrel Handling Equipment
Bulletin 53 SC—Trucks for In-Plant Feeding
Bulletin 54-TL — Trucks for Use with Overhead or Under-Floor Powered Conveyors
Bulletin D — Demountable rubber tired wheels for floor trucks, trailers and casters

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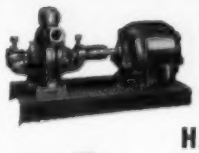

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SANITATION

Bottle Washing Additive

Describes new additive for caustic bottle washing solutions. 4 p.—*United Chemical Corp., Providence. (180A)*

Cleaning Compound

Describes compound recommended for hand cleaning. 6 p.—*Hagan Chemicals & Controls, Inc., Pittsburgh. (180B)*

Post-Processing Sanitation

Discusses dangers of contamination associated with cooling of containers and can handling equipment. T.B. 102, 10 p.—*National Can Corporation, Chicago. (180C)*

Scale Remover

Furnishes data on dry acid for removal of hard water scale and protein deposits on cooking equipment. 6p.—*Key Chemicals, Philadelphia. (180D)*

Powdered Acid

Gives properties and uses of powdered acid scale and rust remover, recommended solution concentrations and application methods. Service Report B-6564, 2 p.—*Oakite Products, Inc., New York City. (180E)*

Laboratory Equipment

Latest edition of "What's New for the Laboratory." 16 p.—*Scientific Glass Apparatus Co., Bloomfield, N. J. (180F)*

INGREDIENTS

Amino Acids

Reprint of report, "Amino Acids in Nine Frozen Vegetables," 4 p.—*National Assn. Frozen Food Packers, Washington, D. C. (180G)*

Anti-Caking Agent

Describes series of ultra-fine particle size materials to resist caking. T.S.B. IPD-8-5, 4 p.—*Chemical Div., J. M. Huber Corp., New York City. (180H)*

Propionic Acid

New 4-page bulletin on propionic acid includes physical properties, specifications and applications. *Bulletin F-40, 161A, 4 p.—Union Carbide Chemicals Co., New York City. (180I)*

Meat Curing Check-Chart

Folder and easy-to-read chart tells the what, where, why, and how of using sodium isoascorbate in cured meat products. Bulletin PL400, 6p.—*Takamine Laboratories, Clifton, N. J. (180J)*

Brominated Oils

Gives technical information on the use, properties, formulas, and other basic facts about brominated oils. *Technical Bulletin No. 37, Brominated Oils, 8 p.—Chemical Sales Div., Abbott Laboratories, No. Chicago. (180K)*

Chelating Agent

New agent designed to operate at very high pH with longer than usual sequestrant life. T. B. No. 557-1, 1 p.—*Sole Chemical Corp., Chicago. (180L)*

Thyoglycolic Acid

Properties, reactions and uses of thioglycolic acid. 20 p.—*Evans Chemetics, Inc., New York City. (180M)*

Amylose and Amylopectin

Describes physical and chemical properties of two principal components of potato starch. 12 p.—*Stein, Hall & Co., New York City. (180N)*

Safflower Oil

Discusses uses of most highly unsaturated vegetable oil commercially available. 6 p.—*Pacific Vegetable Oil Corp., San Francisco. (180O)*

MANAGEMENT

Training Film

Designed to show methods of greater efficiency in bulk mailing. *Non-Theatrical Films Div., Eastman Kodak Co., Rochester, N. Y. (180P)*

Bulk Milk Farm Cooler

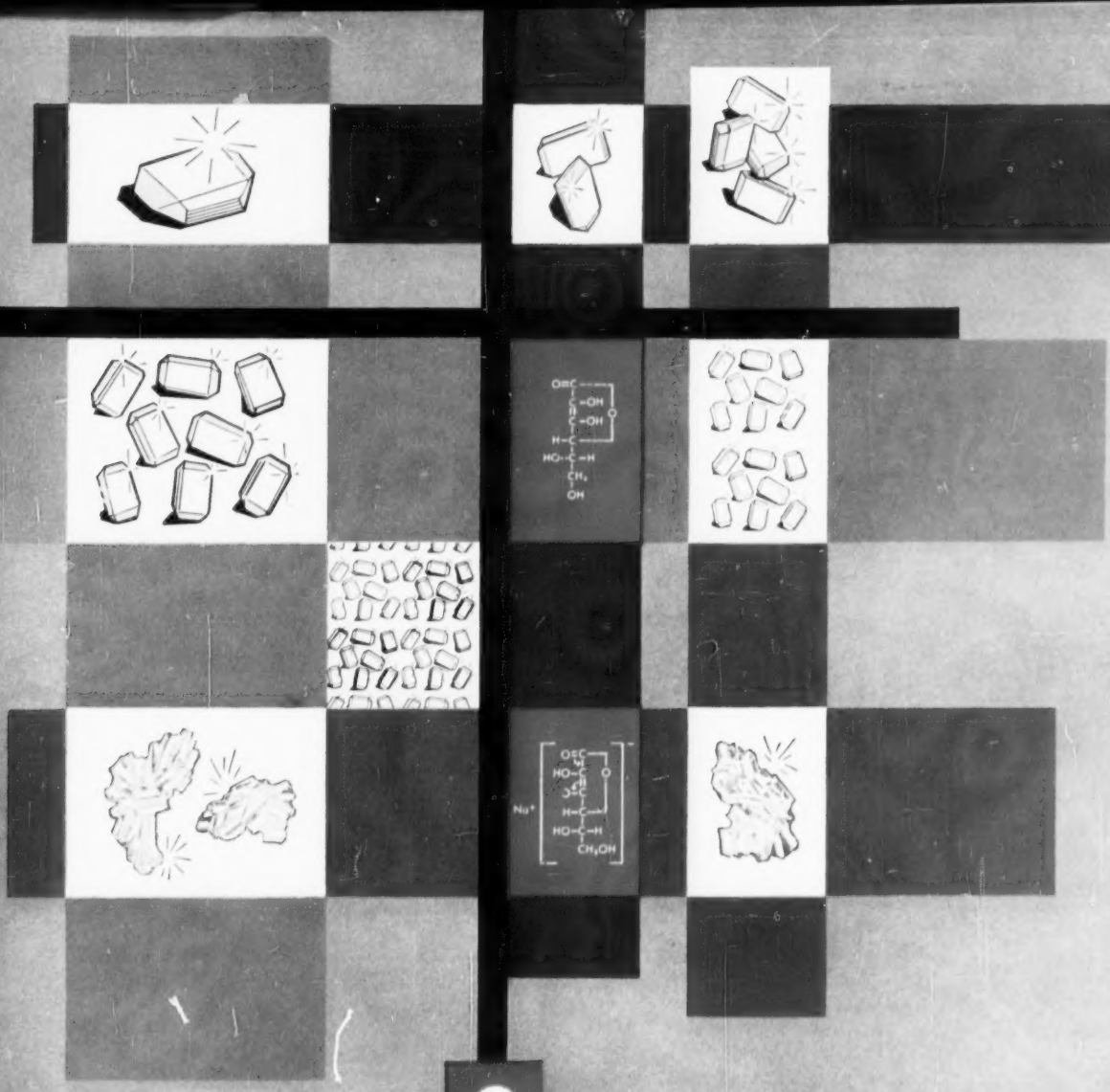
Pictures and describes tank engineered and manufactured to the requirements of the National 3-A Dairy Standard Council. Bulletin #958, 2 p.—*The Pfaudler Co., Rochester. (180Q)*

Duo Washfountains

Newly designed Duo Washfountains that feature easy wall mounting, absence of scuff hose wide hinged foot-treadle, maximum sanitation. *Bulletin K-1204, 4 p.—Bradley Washfountain Co., Milwaukee. (180R)*

All-Purpose Copy-Maker

Describes compact photo-copy unit. Form 160, 12 p.—*American Photocopy Equipment Co., Chicago. (180S)*



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For remedying widespread nutritional deficiencies, vitamin C 'Roche' needs little proof of performance in supplementing diets. Its excellence is accepted—its efficacy established.

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VITAMIN C

Laboratory Data Sheet

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TYPES	DESCRIPTION AND USES
GRANULAR TYPE 20-60	100% (-)1 passes through 20 mesh; 95% is retained on 60 mesh. Similar to granulated sugar in particle size. Satisfactory for direct addition to dried granulations.
FINE GRANULAR TYPE 40-80	100% (-)3 passes through 40 mesh; 95% is retained on 80 mesh. A free flowing product similar to table salt in particle size. Recommended for tablet granulations where fine powder is considered less suitable because of denser packing.
SUPERFINE GRANULAR TYPE 60-100	100% (-)5 passes through 60 mesh. Approximately 25% remains on 100 mesh; 45-50% passes through 100 mesh and remains on 200 mesh; 25-35% passes through 200 mesh. A very fine free flowing crystal suitable for dry gelatin capsules or tableting. Useful in dry mixtures, food supplements.
FINE POWDER TYPE 100	100% (-)7 passes through 100 mesh. Produced by grinding crystalline material. Non-abrasive on tableting dies. Widely used for granulations, solutions, food supplements. Minimizes fractionation of particles in dry mixtures.
ULTRA FINE (MICRO) POWDER TYPE 325	Minimum 99% through 100 mesh. Minimum 90% through 200 mesh. Milled extremely fine. Practically devoid of abrasive action on cutting dies. Recommended for use in direct compression formulations to improve compactibility, flow characteristics and dissolution rate, and improve uniformity of mixing. Also used in preparation of solutions for parenteral use. Because of the fine particle size of Roche material it should not be used in solutions above 35 mg/cc (5000 U.S.P. units/cc).
AMPUL TYPE	Very fine crystals—easily dissolved. Minimum color. Specially produced and tested for use in parenteral solutions. See Roche technical brochure "Notes on Vitamin B₁ and Vitamin C Parenteral Solutions" for complete details.
TYPE F	Especially produced for use in the food industry. Free flowing, will not dust or clump, dissolves easily. U.S.P. in quality. 100% through 50 mesh; 98-99% remains on 200 mesh.

DATA ON PARTICLE FINENESS

Based on U.S.P. XV, pages 918-5; N.F. 10, pages 792-3; "Langes Handbook of Chemistry" 9th Edition, page 911.

The fineness of "powders" is described in both the U.S. Pharmacopeia and National Formulary in terms which are related to the number assigned to a standard sieve made of woven wire cloth. The size of wire, and sieve opening are standardized together with permissible variation in both average and maximum openings.

Sieve Number	Sieve Opening in Microns	Sieve Opening Mm	Permissible Variation in Average Opening Per Cent	Permissible Variation in Maximum Opening Per Cent	Wire Diameter Mm
50	297	0.297	± 5	± 25	0.170-0.253
100	149	0.149	± 6	± 40	0.096-0.125
200	74	0.074	± 7	± 60	0.045-0.061
325	44	0.044	± 5	± 60	0.036

Standards are established for defining the fineness of powdered chemicals, together with a technique for determining the uniformity of fineness. The types of powders described in the U.S. Pharmacopeia and National Formulary do not represent the full range of particle sizes commercially available. No procedure is given for the determination of particle size in the "ultra-fine" or "micro powder" range, sometimes referred to as No. 325. This requires a sedimentation method and measurement in microns. Ordinary sieving methods are inaccurate.

The variation possible in the standard sieves plus such variables as the motion applied to the screen and physical characteristics of the powder being screened affect accuracy and duplicability of screening tests. Particle size specifications based on mesh sizes must always be regarded as nominal rather than as strictly accurate limits of particle size and distribution.

SODIUM /-ASCORBATE** 'Roche'

This is the sodium salt of /-ascorbic acid. It is available as an odorless, tasteless, anhydrous, fine white powder or fine granular substance.

The antiscorbutic activity is in molecular proportion to /-ascorbic acid, one milligram of the sodium salt being equivalent to 0.889 milligram of the acid, or one milligram of the acid equivalent to 1.124 milligrams of sodium /-ascorbate.

Highly soluble in water—62 grams/100 ml at 25°C; 78 grams/100 ml at 75°C. Aqueous solutions are unstable, easily oxidized on exposure to air, or other factors which affect /-ascorbic acid.

The pH of a sodium /-ascorbate solution is from 5.6 to 7.+ as compared with a pure /-ascorbic acid solution at pH 2.3-2.5. The more neutral characteristic of the sodium salt recommends it for high dosage oral forms where gastric sensitivity to lower pH might be undesirable. It is useful in combination with ingredients which would react unfavorably under more acid conditions. Products can be buffered to a suitable pH by combining sodium /-ascorbate and ascorbic acid together.

Commercial forms of sodium /-ascorbate are not recommended for preparation of parenteral solutions. It is more satisfactory to prepare suitably buffered solutions of 'Roche' ampul type /-ascorbic acid, using sodium bicarbonate according to the special Roche method described in our technical brochure, "Notes on Vitamin B₁ and Vitamin C Parenteral Solutions."

Sodium /-ascorbate is of value as an antioxidant for use in comminuted meats and in curing pickles for hams, bacon, and corned beef. Because it is the salt of /-ascorbic acid (vitamin C), a substance naturally occurring in meats and identified in the U.S. Pharmacopeia, it may be preferred to antioxidants in the "chemical additive" class.

COATED /-ASCORBIC ACID—97.5% 'Roche'

DESCRIPTION

Coated ascorbic acid 97.5% 'Roche' is a fine, white, or nearly white powder. It is pure U.S.P. ascorbic acid powder coated with ethyl cellulose. The manufacture of coated ascorbic acid is licensed under Patent No. 2,410,417 to Roche and customers of Roche.

SPECIFICATIONS

Particle Size	100% through 16 mesh screen 75-92% through 40 mesh screen 45-80% through 60 mesh screen 15-60% through 100 mesh screen
Assay	Minimum 97.5% /-ascorbic acid
Identity test	Positive for /-ascorbic acid
Loss on drying	Negligible

USES AND DATA

Ethyl cellulose coated ascorbic acid 'Roche' has these advantages in pharmaceutical tablet manufacture:

- Small size, high potency (250-500 milligrams) tablets of light color can be made from dry granulations with very little excipient.
- Aids in eliminating chipping and capping during compression.
- Retards discoloration, mottling during abnormal storage conditions.
- Reduces contact of ascorbic acid with reactive materials.
- Rapidly available in aqueous solution for assay.
- Provides a tablet with slower release of ascorbic acid, tending to reduce localized acidity sometimes experienced with high potency tablets.

FOOD MANUFACTURERS

- Manufacturers of cured meats can use this type to advantage for retarding smokehouse activity, and for better protection in spice mixtures. It may also provide longer protection of color and flavor during storage and display.

THESE PRODUCTS ARE FOR ANTIOXIDANT USE ONLY. IF USED IN FOOD PRODUCTS, NO CLAIM FOR NUTRITIONAL VALUE CAN BE MADE.

Sodium d-isoascorbate, 'Roche', antioxidant with virtually no vitamin C activity. A white, free-flowing crystalline material. Slightly less soluble than /-ascorbic compounds. When replacing /-ascorbic acid, 23% more should be used to obtain equal antioxidant activity and 8% more when replacing sodium /-ascorbate. These differences are due to the presence of both sodium and water of crystallization which are inactive. Literature on request.

d-Isoascorbic acid 'Roche', antioxidant. Similar to sodium d-isoascorbate described above. Useful where acid reaction or absence of sodium is desirable. 10% less than sodium d-isoascorbate or 10% more than /-ascorbic acid (because of water crystallization) is required for equivalent antioxidant activity.

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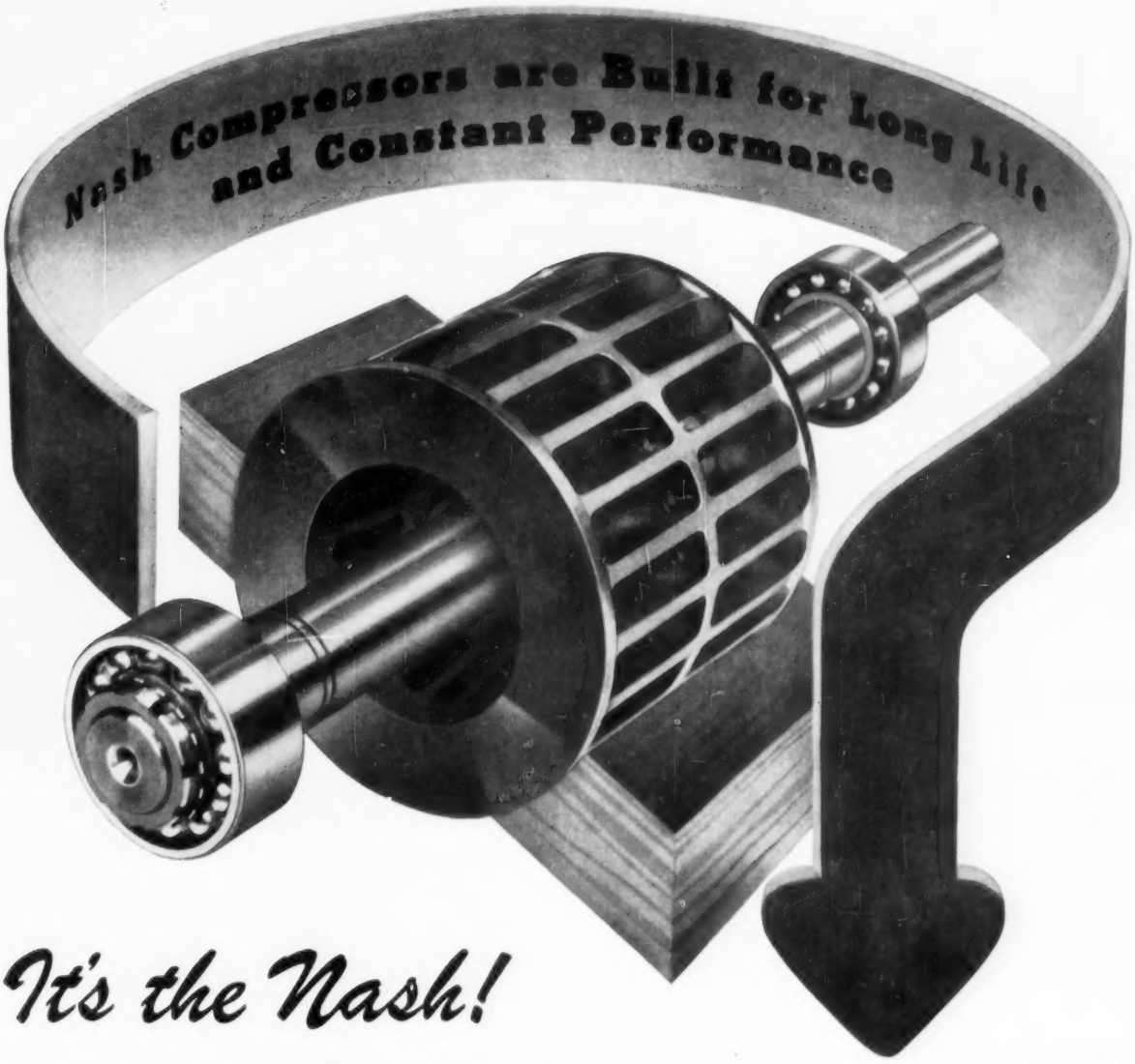

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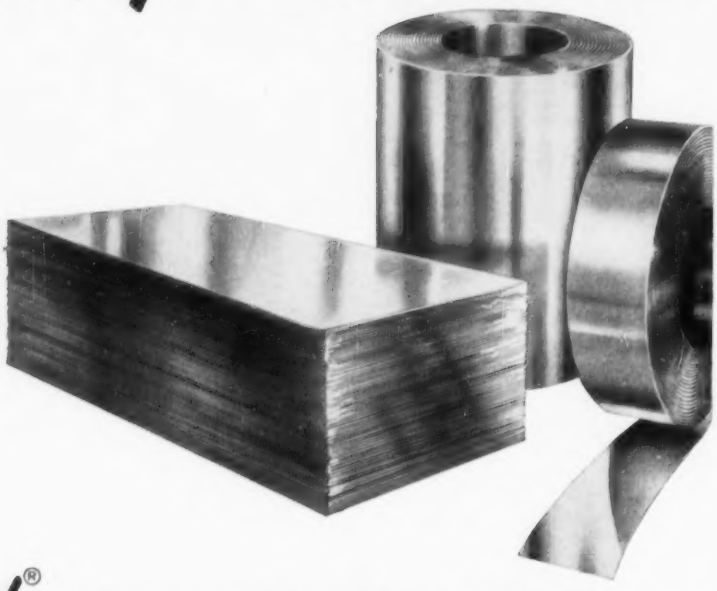

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With today's emphasis on high quality and sanitation in foods, perhaps nowhere is pest control more important than in the food industry. This book offers the ideas of 12 leading authorities in the field.

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BACTERIAL FERMENTATION *by H. A. Barker. Published by John Wiley & Sons, Inc., 440 4th Ave., N.Y.C. 16. 1957. 95 pages, cloth. Price:* $3.

Based on lectures delivered at the Institute of Microbiology, Rutgers, this book covers three types of fermentation: biological formation of methane, butyric acid-butanol, and nitrogenous compounds.

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RADIATION STERILIZATION OF APPLES SLICED *(PB 121962) Published by U. S. Dept. of Commerce, Washington 25, D. C. 77 pages. Price:* $2. Report on research by Quartermaster Food & Container Institute.

BACTERIAL FOOD POISONING AND ITS CONTROL *(Bulletin No. 493) Published by Dept. of Food Technology, University of Massachusetts, Amherst. 39 pages. No charge.* Discussion of types of poisoning, symptoms, and causes.

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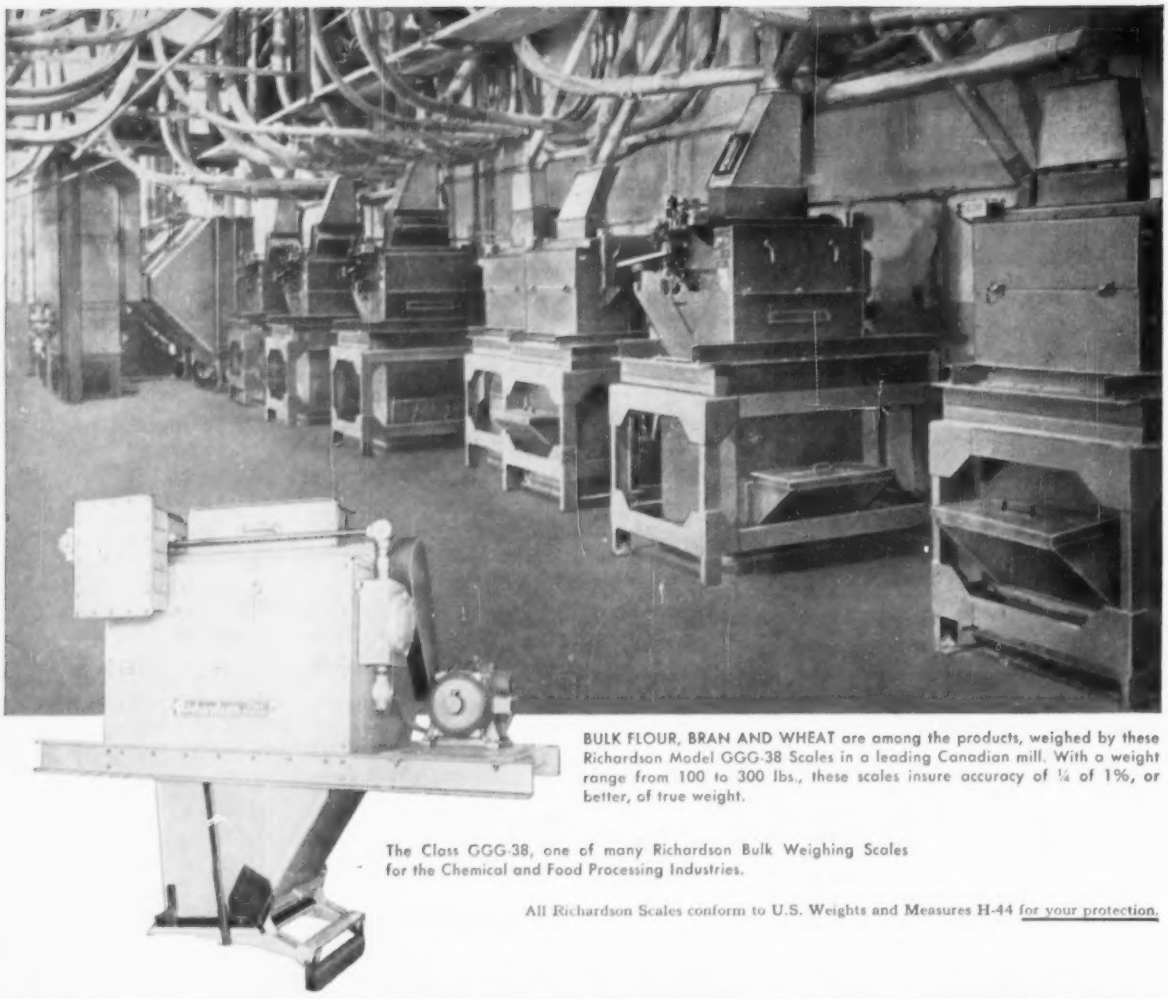

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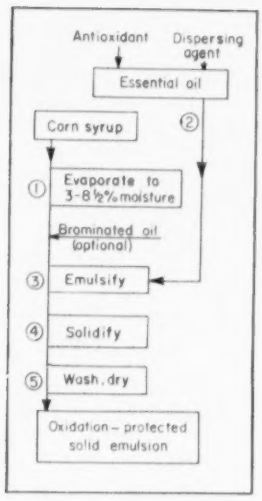

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PRODUCTS

Sodium-Free Meat Cure Containing 80g. NH_4Cl per 1. Water—A. Hunink, Deventer, Netherlands. No. 2,806,793.

Stabilizer for Fats and Oils Consisting of Amino-, Anhydro-Amino-Glycose Reductones —USA. No. 2,806,794.

Orange-Juice Powder From Frozen Concentrate by Liquifying, Adding Corn-Syrup Solids, Vacuum-Puffing, Grinding, Adding Peel Oil, Sorbitol; Packaging With Dessicant—Vacu-Dry Co., Oakland, Calif. No. 2,806,796.

Cube Sugar Comprising Sucrose, Dry Molten Binder—H. J. Steiner, N.Y.C. No. 2,807,559.

Fast-Dissolving Gum Consisting of CMC, Water-Soluble Carbonate, Acid Salt—Hercules Powder Co., Wilmington. No. 2,807,591.

Quick-Cooking Rice Tenderized by Heating With Dry Air —Rice Growers Assn. of Calif. No. 2,808,333.

Turkey-Loaf Prepared by Cooking Bird With Salt, Poultry Seasoning; Boning, Freezing in Broth With Added Gelatin—T. M. Pierce, Tucson, Ariz. No. 2,808,335.

Alginate Composition (for Milk Puddings) Containing Lower Aliphatic Alcohol, Sodium Carbonate, Calcium Salt —Kelco Co., SanDiego, Calif. No. 2,808,337.

High-Protein Milk Made by Aerobic Assimiliation of Lactose—National Dairy Products Corp., N.Y.C. No. 2,809,112.

PROCESSES

Seperating Kernels From Hard-Shelled Nuts by Soaking in Water, Subjecting to High Temperature, Pressure; Releasing Pressure Suddenly—S.A.R.L., Lourenco Marques, Portugese E. Africa. No. 2,806,501.

Hydrolyzing Fish by Ajusting pH, Heating—R. H. Bedford, San Pedro, Calif. No. 2,806,790.

Stabilizing Beer Foam With Water-Soluble Protein Hydrolysate—Premier Malt Products, Inc., Milwaukee. No. 2, 806,791.

Conditioning Poultry for Plucking by Holding Fresh-Killed Birds at 95-125 F. for ½-6 hr. —General Foods Corp., White Plains, N. Y. No. 2,806,792.

Sterilizing Foods by Radiation — Electronized Chemicals Corp., Brooklyn, N. Y. Nos. 2,806,797, 2,807,549.

Ageing Whiskey by Contracting With Charred Wood, Absorbing Volatile Matter of Uncharred Wood—National Distillers & Chemical Corp., N.Y.C. No. 2,807,547.

Preparing a Sugar-Containing Beet Juice by Preheating Slices With Atmospheric Steam, Applying 40-Psig. Steam, Re-

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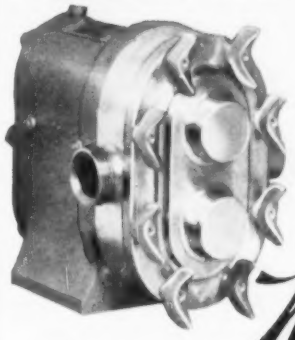

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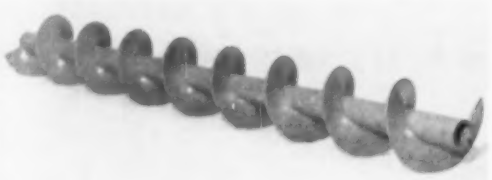

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Deep-Fat Fryer Having Conveyor-Mounted Trays, Vibrating Bar to Remove Excess Fat Brock & Co., Philadelphia. No. 2,807,203.

Vegetable Chopper Comprising Oscillating Hopper, Knives, Fixed Cutting Block—H. S. Koeshall, Racine, Wis. No. 2,807,298.

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Meat-Molding Head Having Tubular Inlet, Flattened Outlet, Carrier—A. H. Rentrow, La Canada, California. No. 2,808,614.

Moisture Determiner Adopted to Preserve Test Results—Pillsbury Mills, Inc., Mineapolis. No. 2,808,720.

Filled Milk-Carton Crusher Employing Piercing Pins, Liquid Drain — Dari-Research Corp., Cleveland. No. 2,808,776.

PACKAGING

Coffee Package Having Layers of Foil and Filter Paper Forming Funnel for receiving Hot Water—R. A. Doppler, N.Y.C. No. 2,805,164.

Pocket-Wheel Stacker for Cracker-Type Sandwiches — F. E. Fowler, Athens, Ga. No. 2,805,756.

Bottle-Carrying Carton With Attached Cap-Lifter—J. P. J. Vickers, Dartmouth, Nova Scotia. No. 2,806,393.

Packaging Perishables by Overwrapping Group of Cartons With Metal Foil—W. L. Morrison, Lake Forest, Ill. No. 2,807,548.

Heat-Sealed Package for Pre-Broiled Bacon Adopted for Heating in Bread-Toaster Slot —W. M. Zarotschenzeff, Douglaston, N. Y. No. 2,807,550.

Insulated Shipping Container for Frozen Foods—N. J. Gilman, Gilman, Conn. No. 2,808,093.

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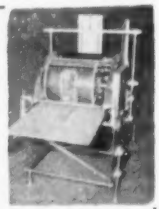

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Vegetable canners . . . bakers . . . butter, cheese and oleomargarine manufacturers . . . meat packers . . . fish packers . . . virtually the entire food-processing industry agrees: *Sterling Purified Salt is a superior product.* Experience on production lines everywhere has shown that Sterling Purified Salt always protects the flavor, color and texture of food. Thus, it is used "whenever salt of the highest quality is needed."

Sterling Purified Salt is guaranteed to contain more than 99.95% sodium chloride. There are never more than 40 parts per million combined calcium and magnesium, never more than 0.5 parts per million copper or iron. Downgrading of food—caused by excessive calcium or magnesium content in salt—is *eliminated.*

Here's what food processors have to say about this remarkable high-purity salt:

"We've been using Sterling Purified Canners Salt for years on our lines, because we like the way canned vegetables always retain their rich natural colors."

"We've licked the problem of oxidative rancidity in vegetable fats and oils caused by impurities in ordinary salt. We use only Sterling Purified Salt."

A meat packer has this to say: "We always use Sterling Purified Salt to protect meat flavors."

A successful baker reports: "Every loaf of bread and every cake we bake has just the right texture. One of the important reasons is that we always use Sterling Purified Bakers Salt to prepare the sponge."

These are typical of the comments food processors have for the quality of Sterling Purified Salt.

Equally favorable are the reports on Sterling Purified Salt's additional features. Because it's a *granulated* salt, it offers these distinct advantages:

1. It won't break up in shipping or handling—always maintains its uniform crystal size.
2. It has a constant volume for any given weight—can be measured with precision on either a weight or a volume basis.
3. It dissolves instantly and *uniformly*—in every type of salting operation.

You can use Sterling Purified Salt dry, or in brine form, with equal effectiveness. Many of today's food processors, however, find brine most convenient and economical, because it greatly simplifies salt handling and reduces salt consumption. To make high-quality brine automatically from Sterling Purified Salt, International has developed the Sterling Evaporated Salt Dissolver in many custom designs and sizes . . . in steel, Monel metal, or corrosion-proof plastic.

Other Modern Equipment Dispenses Sterling Purified Salt in Bulk, Tablets, Brine

Today's canners benefit from three more efficient, modern salt-dispensing machines available from International. The newest one is the Sterling "Electro-Portioner" Brine Dispenser, which can dispense brine into as many as 300 cans per minute—with consistent accuracy. Also available is the Sterling Saltomat, for depositing Sterling Purified Salt tablets into cans on fast-moving lines . . . and the Sterling Bulk Salt Dispenser, which handles Sterling Purified Salt in dry, granular form.

FOR COMPLETE DETAILS on salt dispensers, brine-making equipment, or salt-handling techniques . . . and for expert technical assistance on any problem of salt or brine—get in touch with International Salt Co. One of our "Salt Specialists" will be glad to help you get maximum efficiency and economy from the salt you use.

International Salt Co., Scranton, Pa.

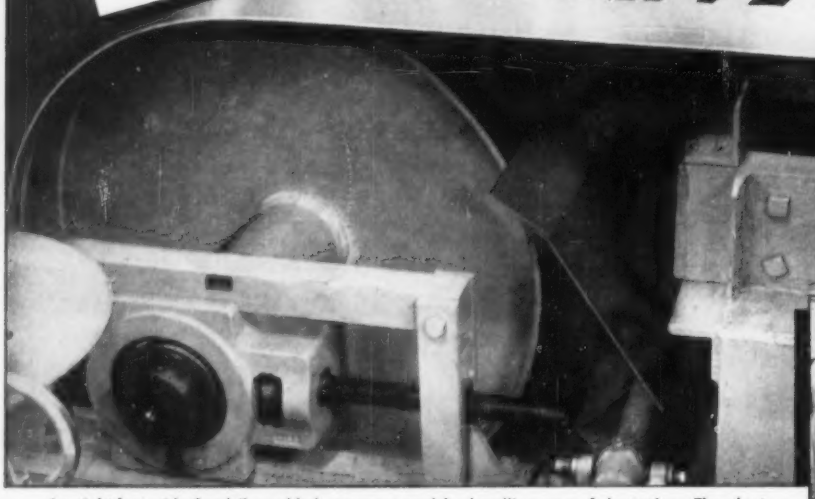
Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; Memphis, Tenn.; and Richmond, Va.

STERLING PURIFIED SALT . . . CANNERS SALT . . . AND BAKERS SALT are all the same high quality. They more than meet the low requirements for calcium, magnesium, copper and iron for the entire food-processing industry.

FOR INDUSTRY, FARM, AND THE HOME—
STERLING SALT
PRODUCT OF INTERNATIONAL SALT CO., INC.

See the ANSWER TO YOUR FOOD CONVEYING PROBLEM in this surface?

SANDVIK STEEL-BELT CONVEYORS



An eight-foot wide Sandvik steel-belt conveyor used for handling cans of shortening. The plant where this conveyor is installed has experienced up to 25 years of satisfactory service from an earlier Sandvik conveyor installation.

Sandvik steel-belt conveying work table makes cutting up of dressed hogs a continuous production line operation.

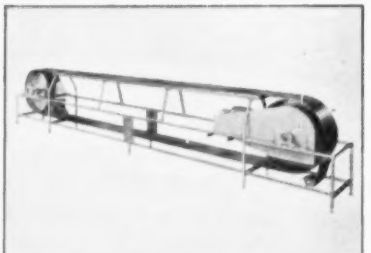
The smooth, impervious, easy-to-clean surface of Sandvik steel-belt conveyors has improved processing of a wide variety of foods. Here are some reasons why:

The conveying band provides a continuous, unbroken flat surface of stainless or carbon steel. — Live steam or boiling water can be applied directly. — Steel scrapers can be used for cleaning or discharge. — Withstands baking or drying temperatures. — No taste contamination. Smoothness facilitates slide handling (a vital advantage for can conveying). — High load capacity. — Long service life. — Belts can be of any length or width.

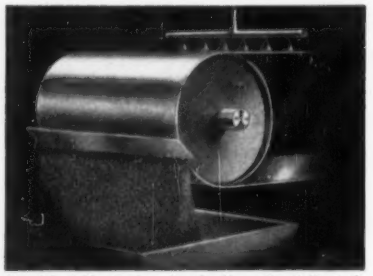
COOLING ARRANGEMENT—Sandvik conveyors can be built with a patented water-bed arrangement which cools from beneath . . . no water gets on top of the band. You can cool and convey, regulate thickness while cooling, cool and strip off gelatinous materials in sheet form, cool loose and pulverized materials, cool solids in sheet form and cool materials in layers.

ENGINEERING HELP—Sandvik's engineering department will be glad to work with you in designing a conveyor to fit your operation. Sandvik has had over thirty years of experience in designing conveyors to operate either as independent units or as integral parts of special processing equipment.

Write, wire or phone for further information.



A small Sandvik conveyor designed to cut meat handling costs.



Simplified illustration showing how Sandvik steel-belt was used in a continuous vacuum drier for soluble coffee. Scraper blade removes crystallized coffee from band.

SANDVIK STEEL BELT CONVEYORS

SANDVIK STEEL BELT CONVEYORS
Division of Sandvik Steel, Inc.
1702 Nevins Road, Fair Lawn, New Jersey
Tel. SWarthmore 7-6200
Branch Offices: 230 N. Michigan Ave., Chicago 1, Ill. FRanklin 2-3638
3338 South Malt Ave., Los Angeles 22, Cal. RAymond 3-9116
IN CANADA: SANDVIK CANADIAN LTD.
P. O. Drawer, 1330 Sta. O., Montreal 9, P.Q.
SS-85 Manufacturers Of Steel Belt Conveyors For Over 40 Years

WHERE TO

- **STORE** Frozen Foods
- **BUY** Ingredients, Equipment, Parts, Services

CARROT OIL makes food golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A activity.

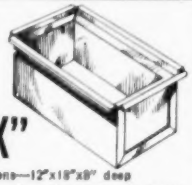
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A activity of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET

New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals, important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

It's the NEW "KARI BOX"



Inside dimensions—12"x18"x8" deep

This revolutionary nesting "Kari Box", built of 24 gauge galvanized metal reinforced with ¼" wire top edge for maintenance free life, has been engineered by VIVENTI METAL FABRICATORS to solve your stacking, storage and shipping problems. This sturdy, light-weight . . . only 7¼ pounds . . . "Kari Box" speaks for itself!

LOT—PRICE	
1 to 100—	$4.00 Ea.
100 to 200—	3.85 Ea.
200 to 500—	3.75 Ea.
500 & over—	3.65 Ea.

Del. F.O.B. Nutley, N. J.

Ask about our SPECIAL "KARI BOX" with perforated holes that allow circulation of air and can be stacked 10 high!
WRITE, WIRE, OR PHONE TODAY FOR FURTHER DETAILS OR SAMPLES!

VIVENTI METAL FABRICATORS
"SHEET METAL ENGINEERS"
89 River Rd., Nutley, N. J. NUtley 2-2252

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

SANITATION CONSULTING SERVICES

Let us perform a sanitation audit in your plant to reveal its *TRUE* condition and help reduce costs.

AMERICAN SANITATION INSTITUTE
884-86 Hodiamont St. Louis 12, Mo.
Ph. PA 5-7820

EMPLOYMENT OPPORTUNITIES

NATIONAL COVERAGE

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant | Civil Service Opportunities | Employment Services
Positions Wanted | Selling Opportunities Wanted | Employment Agencies
Part Time Work | Selling Opportunities Offered | Labor Bureaus

RATES

DISPLAYED

The advertising rate is $37.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

UNDISPLAYED

$1.80 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS to FOOD ENGINEERING, Class Adv. Box 12, N. Y. 36, N. Y. for January issue closing December 27th

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BIO-CHEMIST

Salary $8-9000

Ph.D. Senior Research in fermentation. Experience preferred, but not required. Work in Minneapolis for large multi-plant firm. Fee, interview, and moving expenses paid. Send complete resume to H. A. Jensen

WALKER EMPLOYMENT SERVICE
212 So. 7th Street Minneapolis 2, Minn.

CHEMIST OR CHEMICAL ENGINEER

Good opportunity with long established food confections processor. Ten years experience or more preferred processing analytical quality control and research. Please reply in detail with the understanding that all correspondence will be strictly confidential.

P-6621, Food Engineering
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

WE NEED
FOOD TECHNOLOGISTS and FOOD CANNING CANDIDATES
—junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-8600

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

Foremen: Upstate New York Food Manufacturing Plant has good opening for a qualified foreman. Position offers rapid advancement for Industrious, Capable man. Preference given Individual having experience in the Manufacturing of Bakery Supplies. P-6612, Food Engineering.

EMPLOYMENT SERVICE

Salaried Personnel. $5,000-$30,000. This confidential service established 1927 is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F., P. O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Biochemist. M. A., Experienced in production management, establishment and supervision of quality control and research programs. Present salary $8500. PW-6723, Food Engineering.

Production Manager—15 years experience in food processing and freezing, layout and personnel supervision. PW-6694, Food Engineering.

CHEMICAL ENGINEER

Project Leader

Career opportunity in fast growing INSTANT COFFEE business, acquiring production experience for continuing plant expansion, self-supervisory position over small permanent development group with use of full technical and delegating abilities.

Relocation paid to fast growing Houston, Texas. Resume should include details of education and experience.

Experience: 5 to 10 years in research and development and some production. State current salary, salary desired and availability.

Technical Director
J. A. FOLGER & CO.
P. O. Box 2111 Houston 1, Texas

FOOD TECHNOLOGIST FOR TECHNICAL SERVICE

Position open for Food Technologist with experience in baking, particularly wholesale bread. Responsibility will include laboratory and customer contract. Location Clinton, Iowa.

Submit resume to:

Director
Technical Sales Service Department
CLINTON CORN PROCESSING COMPANY
Clinton, Iowa

TECHNICAL DIRECTOR

Experience in tomato products and dry pack required. Responsible for quality control, sanitation, research and development. Appropriate salary, profit sharing and other benefits. Send resume to

G. S. SUPPIGER, JR., PRESIDENT
Brooks Foods, Inc.
General Offices, Collinsville, Illinois

CHEMISTS

Salary $5000-7000

Several openings with large multi-plant firm for quality control, research and analytical chemists and food technologists. Send complete resume to H. A. Jensen

WALKER EMPLOYMENT SERVICE
212 So. 7th Street Minneapolis 2, Minn.

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

DISPLAYED RATE:

The advertising rate is $16.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

UNDISPLAYED RATE:

$1.80 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

PROPOSALS, $1.80 a line an insertion.

BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

Send NEW Ads or Inquiries to Classified Adv. Div. of Food Engineering, P. O. Box 12, N. Y. 36, N. Y., for January issue closing December 27th

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

SPECIAL SERVICES

Laboratory Equipment Repair Co. 1810 W. Ogden, Chgo 12, Ill. Fast 24 Hour Service.

Rebuild those leaking valves!! Sanitary valves rebuilt for a fraction of the cost of a new valve. Prices submitted on request. Stuart W. Johnson & Co., 611 Main Street, Lake Geneva, Wis.

Instrument Repair. Temperature regulators, mercurial indicating thermometers and recording thermometers of all makes repaired. Complete satisfaction guaranteed. Stuart W. Johnson & Co., 611 Main Street, Lake Geneva, Wis.

FOR LEASE

For Lease—Complete vegetable and strawberry processing plant, and other modern processing machinery, including Package Machinery Corp. automatic wrapping machine, all housed in modern building located in center of industrial section of Central Arkansas. Quick Freezing Plant with 40 Tons daily capacity at —30°, and Cold Storage Warehouse with capacity of 300,000 cubic feet located on property and available for use. Railroad siding and truck dock available. For details write FL-6424, Food Engineering.

AVAILABLE IN GERMANY

German Engineering—office in the business centre of Hamburg **offers** services in (food) Engineering for American Companies desiring own office with telephon, telex, 2 cars and 4 rooms against monthly payment of $250.

Dipl.-Ing. C. Keysler, Hamburg 36
Neuer Wall 61, Cable: Keysing

BRITISH FIRM AVAILABLE TO MANUFACTURE UNDER LICENSE

British firm of engineers with experience in the manufacture of machines for industrial use, would welcome the opportunity of making, under license, specialty or patented machines for the food processing trade. Advertisers have had considerable experience in making and marketing engineering products in Great Britain and the principal countries of Europe and the British Commonwealth. Good sales staff are available and there are ample facilities for servicing machines and for looking after maintenance and the supply of spare parts. Firms interested in having machines manufactured under licence for British or European markets should write, if possible before December 31st. A Director of the Company will be visiting the U.S.A. in the early part of 1958, and will be available for consideration of proposals and preliminary talks during the month of February.

LISTER BROTHERS LTD., Nightingale Vale, Woolwich, London, S.E.18. ENGLAND.

Wanted to Buy:

Standard Knapp Labeller, Model HOR I or Model B Heavy Duty, adjustable to take glass jars ranging from 2¼x5 to 4x7 not more than two years old in good condition.

Three similar SS Tanks 5 foot dia about 3 or 4 ft high, open top, on 4 legs at side position, sanitary construction No. 4 finish with slow speed bottom agitators bottom outlet.

HARRISON COFFEE CORP.
72 Mill St. Paterson 1, N. J.
MUlberry 4-6249

LATE MODEL PACKAGE MACHINERY

Transwrap, Model "H" and "C"-Net Weight and Volumetric.
Package Machinery, Models FA, FA2, F10J Bundler also Hayssen, Scandia.
Battle Creek, Model 43 w/Eye & Model 46.
Resina Capper, High Speed and Single.
Pneumatic Scale Samco 20 Head Filler.
Pneumatic Pony, World Labelers.
Horix, Karl Keifer, Ertel Fillers.
Pneumatic Scale High Speed Cartoning Line (New in Original Crates)
Pneumatic Scale Cartoning Line-30 CPM.
Pack-O-Matic Short Case Sealer.

SELL US YOUR SURPLUS EQUIPMENT

R P M INC
254 – 36TH STREET
BROOKLYN 32, NEW YORK
STerling 8-1550

FOR SALE
1 PACKAGE MACHINERY MODEL #F-10 BUNDLER
Hand feed, speed 8 to 24 bundles per minute, adjustable size range; machine 1½ years old and used very little.
FS-6627, Food Engineering
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

BARGAINS FOR SALE

The Ruderman Machinery Exchange of Gouverneur, N. Y., one of the largest diversified Machinery & Equipment Dealers in America, can furnish you with practically all your needs in Modern Ice Cream, Milk Plant and Electrical Equipment at but a fraction of the original cost.

WRITE—WIRE—PHONE FOR YOUR NEEDS

RUDERMAN MACHINERY EXCHANGE
Gouverneur, New York Telephone: 333-334

FOR SALE

(1) Karl Kiefer 24 spout rotary vacuum filler.
(1) Pneumatic scale 18 spout straight line vacuum filler and air cleaner combination.
(1) Filler Machine Co. four line piston filler.
All contact parts and conveyors on fillers are stainless steel.
(1) Bellamy spot labeler for round containers, speed to 165 per min.
(1) World twin turret labeler speed to 140 per min.
All equipment in excellent condition ready to hook up and run.

FS-6626, Food Engineering
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

FOR SALE

York Plate Heat Exchanger Pasteurizer with Taylor controls—practically new.....$3000.
2—90"x32" Buflovac roller drier.....2500.
(These driers in good condition, complete with S.S. stacks up through roof)
5 H.P. York Self Contained ammonia refrigerating unit..... 500.
Wickes 125 H.P. water tube boilers, Ray Horizontal Rotary oil burner system, including approx. 50' stack.....7500.
5—600 gallon C.P. vats. Good condition.
Many other pieces of dairy equipment. Please write for list.

Address inquiries to:—**A. E. GROTH**
DARIGOLD PLANT
P. O. Box 157 Bellingham, Wash.

FOR QUICK SALE
NEW HOTTMANN MIXERS and CUTTERS
Tremendous price reductions
MIXERS Inc., Phila. 34, Pa.

FOR SALE

500# Buffalo Stuffer, $1395.00
Buffalo 1000# Mixer, $1295.00
Enterprise 25 h.p. Grinder, $1275.00
Guilloting Cutter, $595.00
15 TPH Ice Crusher, $375.00
25 H.P. Bone Crusher, $1450.00

KEEBLER ENGINEERING COMPANY
1910 W. 59th Street Chicago 36, Illinois

FOR SALE
1—PATTERSON KELLY 30 cu. ft. Stainless Steel Twin Shell Blender
With 3 H.P. Explosion Proof Motor—Used only t.. se weeks.
FREUND BAKING COMPANY
920 South Taylor Ave., St. Louis 10, Missouri
Pn FR 1-1282

FOR SALE
1—FMC Continuous Abrasive Peeler
1—Mercury Electric Truck, 2 ton lift
1—40 Gallon S.S. Jacketed Kettle
1—CRCO Model 600 Filler
1—2t pocket Pfaudler Rotary Piston Filler
1—Continental #10 Can Opener
1—Continental 24 valve S.S. Juice Filler

ALARD INDUSTRIES INC.
Post Office Box 367 Williamson, N. Y.

Liquidation

TRENTON CHEMICAL CO.

TRENTON, MICHIGAN

1—Swenson Quadruple Effect forced circulation Evaporator 12,975 sq. ft.
1—Arnold 6′ dia. 316 S.S. Evaporator 325 sq. ft.
1—Harris 3′ dia. 316 S.S. Evaporator.
3—American 42″x120″ double drum dryers.
3—Louisville 6′ dia. x 50′ rotary steam tube dryers.
2—AT&M 42″ suspended, 304 S.S. Centrifugals.
2—Tolhurst 42″ suspended, steel Centrifugals.
36—Centrifugal & Rotary Pumps, Stainless, Olivite, Haveg & Iron, 1½″ to 4″.

Write or phone for detailed circular. Representative on premises.

BRILL EQUIPMENT COMPANY
2401 Third Ave., New York 51, N. Y.
Cypress 2-5703
or
608 Harrison Ave., Trenton, Michigan
Orleans 6-5110

FOR SALE

2 Water Tanks, 2,500 gallon

5′ diameter x 18′ long, 125 lb. working pressure, 7/16 shell thickness, new in 1950. Excellent shape.

FS-6564, Food Engineering
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

EXCEPTIONAL EQUIPMENT OFFERINGS

Buflovak Flaker or Dryer in 316 S/S 4′ x 5′ complete with accessories.
3 Stainless Drying Drums 5′ x 4′.
American Dbl. Door Sterilizers sizes up to 36″ x 42″ x 84″.
NEW FALCON Stainless Ribbon Blenders; 86 cu. ft.; 40 cu. ft.
2 Mojonnier Stainless Steel Vacuum Pans; 6′ x 12′ & 3′ x 10′.
2 Stainless Steel 5000 Gal. Heavy Duty Mixing Tanks.
Sharples Stainless Steel C27 Super-D-Hydrator; 30 HP XPL.
Bird Continuous Centrifugal Filter in Stainless; 18″ x 28″.
Aluminum 5000 Gal. ASME coded Pressure Tank; 8′ x 12′; manhole type.
Two A. O. Smith Stainless Lined Pressure Tanks; 10′ x 18′7″.
Four Stainless Hor. Tanks; 6′ x 34′, 3/16″ thick shell; manhole type.
Stainless Truck Type Tank; oval 4′H x 6′w. x 21′ long; insulated.
Standard Knapp Top & Bot. Aut. Gluer and Sealer Model 429.
Stokes & Smith Powder Fillers.
Kiefer Rotary Vacuum Fillers.
Kiefer 2 Stream Vari Visco Filler.
Labelers by Standard Knapp, Kyler, Burt, New Jersey, World Automatic etc.
Cappers by Pneumatic Scale, Capem, Resina—fully automatic.
Sifters by Rotex, J. H. Day, Patterson, Robinson, Selectro and others.
Hammer Mills up to 150 HP operation by Williams, Gruendler, Mikro etc.
Stainless Steel Homogenizers, Colloid Mills, Viscolizers all types.

SEND US YOUR LIST OF SURPLUS EQUIPMENT

FIRST MACHINERY CORP.

209-289 TENTH STREET, BROOKLYN 15, N. Y.
PARKING ON THE PREMISES
PHONE: STerling 8-4672

FRED FIRSTENBERG *President*

Cable "EFFEMCY"

FOR SALE

VACUUM FILLER

1—Mojonnier Bros. stainless steel construction, Model No. 90, Number 625. Set up to fill pint cans. Complete with Nash Vacuum Pump, bronze construction, Type MD-673, Test R-6117 with 3 HP, 3 ph., 60 cycle, 220/440 Volt motor.

FS-6510, Food Engineering
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

FALL SPECIALS

HARD TO GET ITEMS

Container Fillers, Canco #15 #334; Milk Bottle Fillers, Cemac 14, 28; Cherry-Burrell GV-10, 16, 20; 1,000 and 3,000 gallon Steriline S.S. Milk Storage Tanks (Not Cold Wall); 300 gallon Pasteurizers, Pfaudler, Creamery Package and Oakes & Burger; Creamery Package all Stainless Steel, H.T.S.T. 7,000#, York 10,000#. Many other items. Send us your inquiries. What do you have for sale? WE FLY TO BUY.

LESTER KEHOE MACHINERY CORP.
23 Congress St. — P.O. Box 82
Staten Island 4, N. Y. Gibraltar 7-3410

GO WEST FOR THE BEST

★ 2—FMC Model 100 Pulpers, 20 HP ★
★ 2—Zenith Model 2 L S.S. Presses, 20 HP ★
★ 1—Elgin Twin Piston S.S. Filler, qt piston ★
★ 1—Elgin 18 piston S.S. Rot. Filler, Comp. ★
★ 1—M & S 210 Filler, 6 piston br. contact ★
★ 1—M & S 9 piston Filler, brass contact ★
★ 1—Resina auto. single head Capper, 28, 38 mm ★
★ 3—Lee 100 gal S.S. agitated Kettles ★
★ 2—Groen Model RA 60 gal S.S. Kettles ★
★ 2—250 gal Lee S.S. Kettles, 100# jkt press ★
★ 1—1500 gal Stainless Steel Tank ★
★ 1—Canco 08 Seamer, set for 46 oz. Rebuilt ★
★ 1—Canco 400 Seamer, 401 diameter cans ★
★ 1—Canco 400 Seamer, 211 diameter cans ★
★ 1—Canco 400 Seamer, 300 diameter cans ★
★ 1—Std Knapp Model F Caser, 211 size cans ★
★ 1—FMC Juice Processor, S.S. 4 unit flg 4500 ★
★ 1—Std Knapp Model F Casers, 6 oz—#1-#2 ★
★ 1—Stokeswrap Model BS, liquid or solid ★
★ 1—Kyler 8 ounce—2½ adjustable Labeler ★
★ 1—A-B 2-2½ Cooker & Cooler, 2000 cans ★
★ 1—A-B 2-2½ 20 Valve Syruper ★
★ 1—3′ x 2′ Oliver Rotary Cont. Vac. Filter ★
★ 1—Cleveland #7 Kleen-Kut Meat Grinder ★
★ 1—Rietz RD-12 Stainless Disintegrator, 25 HP ★
★ 2—6½′ x 45′ Rotary Dryers, ½″ Shell, hvy ★
★ 1—A T & M 42″ S.S. susp Centrifuge, perf ★
★ 3—Tyler-Hummer 3′ x 5′ single deck Screens ★

★ PACKAGING EQUIPMENT—Fillers, Cappers, Casers, Labelers, Many sizes, types. Send Inquiry. ★

GOOD USED EQUIPMENT

MACHINERY AND EQUIPMENT COMPANY — GO WEST

514 Bryant Street • San Francisco 7, Calif.

LOEB OFFERINGS

Boilers: 15 hp. Eclipse, 60 hp. Sellers, gas.
Capers: automatic and semi-automatic.
Centrifugals: Fletcher 12″ copper, 17″ stainless, 20″ lithcoated, Tolhurst 26″ rubber covered.
Clarifiers: De Laval and Sharples.
Deodorizers: Rogers 40″ stain. steel.
Dryers: Link Belt MonoTube, monel.
Dryer: Hardinge 3′ x 24′ hot air.
Dryer: Devine 2 x 4′ vac. drum, st. steel.
Dryer: Bowen lab. spray, st. steel.
Dryer: Direct Heat 4′ x 20′.
Dryer: Nordyke-Marmon 120 bu.
Fillers, liquid: vacuum, siphon, gravity.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers: M & S for cans 6 and 10 pocket, st. st.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filter Presses: Sperry, Shriver 6″-36″, recessed and plate and frames types.
Filters: Int. pressure—Alsop, Sparkler, Lomax, Sweetland with 30 24″ st. st. leaves.
Filter, vacuum: Oliver 2½ x 1′.
Grinder: Enterprise, 7½ hp. motor, 6″.
Homogenizers: Manton-Gaulin 25 GPH., 60 GPH., 300 GPH., Flowmaster model 200.
Kettles: Dopp 150 gal., jkt. agitated.
Kettles, Stainless steel: 20 to 500 gal., with and without agitators.
Labelers: Burt, Knapp, New Jersey, World.
Mills, hammer: Mikro, Gump, Prater, Raymond, Jay Bee, Jeffrey, Williams, Fitzpatrick.
Mills, colloid: Charlotte 20 hp., 1 hp. Patterson 4′ x 5′ chrome manganese. Patterson 30 x 42″ chrome manganese
Mixers, dough type: single and double arm. Glen Power Plus 340 qt., 5 hp. Powder: 50 to 2000 lb. capacity. Gemco 5′ x 14′, stain. steel, 40 cu. ft. cap. Day high speed, 40 hp.
Muller: Simpson 39½″ type 316 s.s. bowl.
Percolators: Pfaudler 54 x 42″ stain. steel.
Pumps: Centrifugal, rotary, gear, vacuum.
Reactors: Pfaudler 300 gal. stainless.
Screens: Selectro 4 x 10′, 3 deck.
Sealers: Ferguson, Triangle, Ceco, ABC.
Separator: De Laval, Nozle-Matic AC VO.
Sterilizer: American 42″ x 52″ x 11½′ long.
Still, water: Barnstead 75 gal.
Tablet Presses: Single punch and rotary.
Tanks: Stain. steel 25 gal. to 1200 gal.
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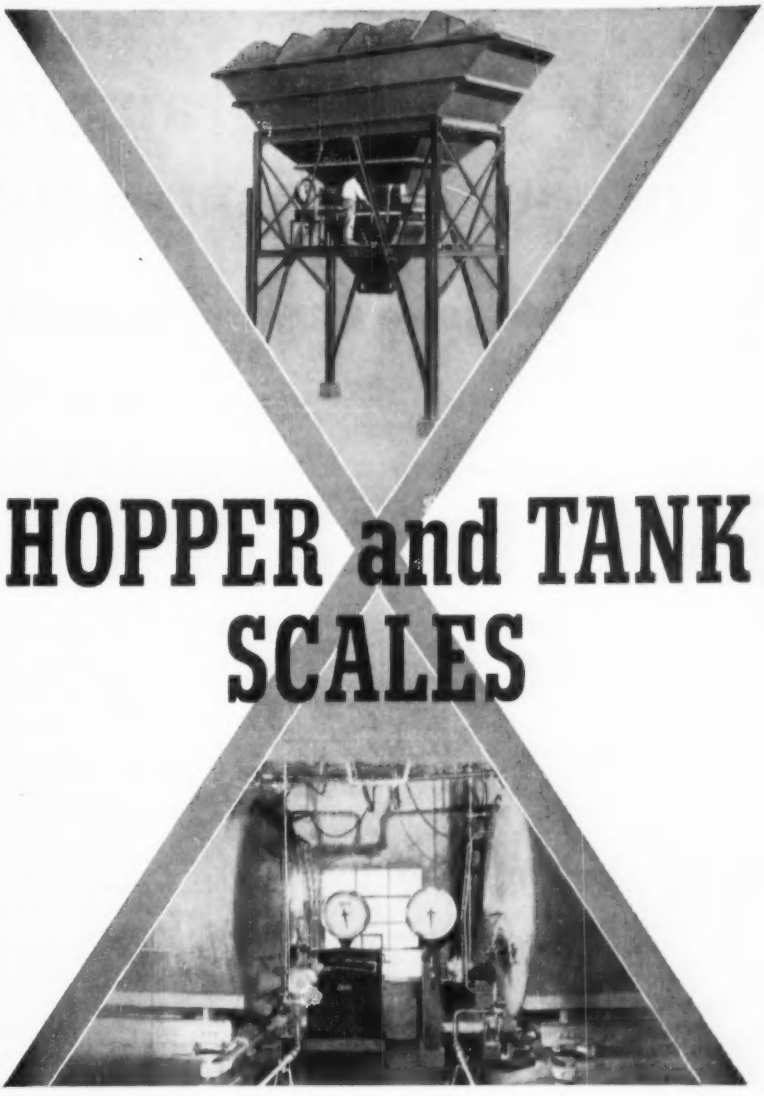

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1 **I need unbiased information on the best grain product for my purposes.**

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5 **My process involves enzymatic conversions,**

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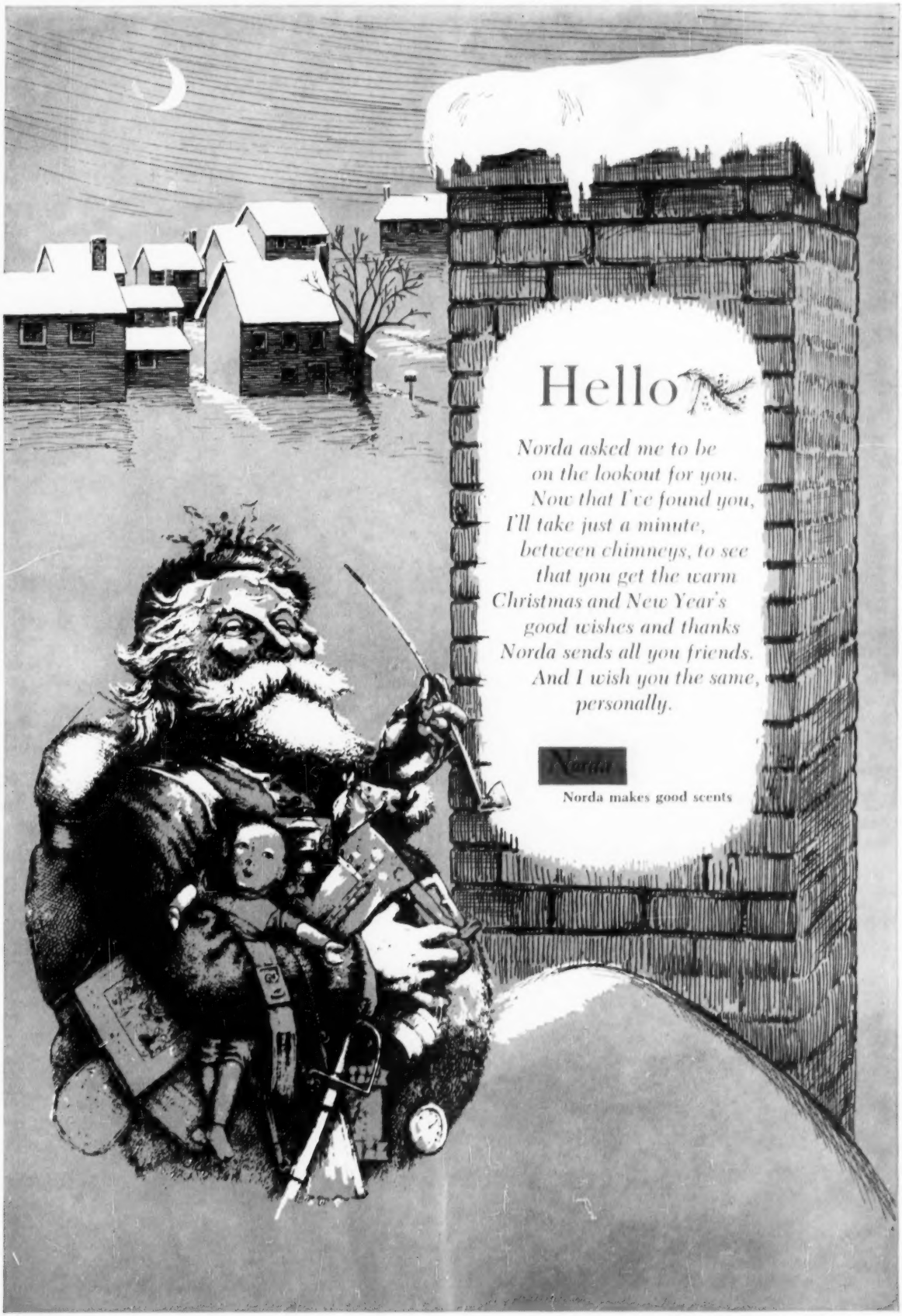

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